AUBURN VALLEY PUMP STATION

FOR

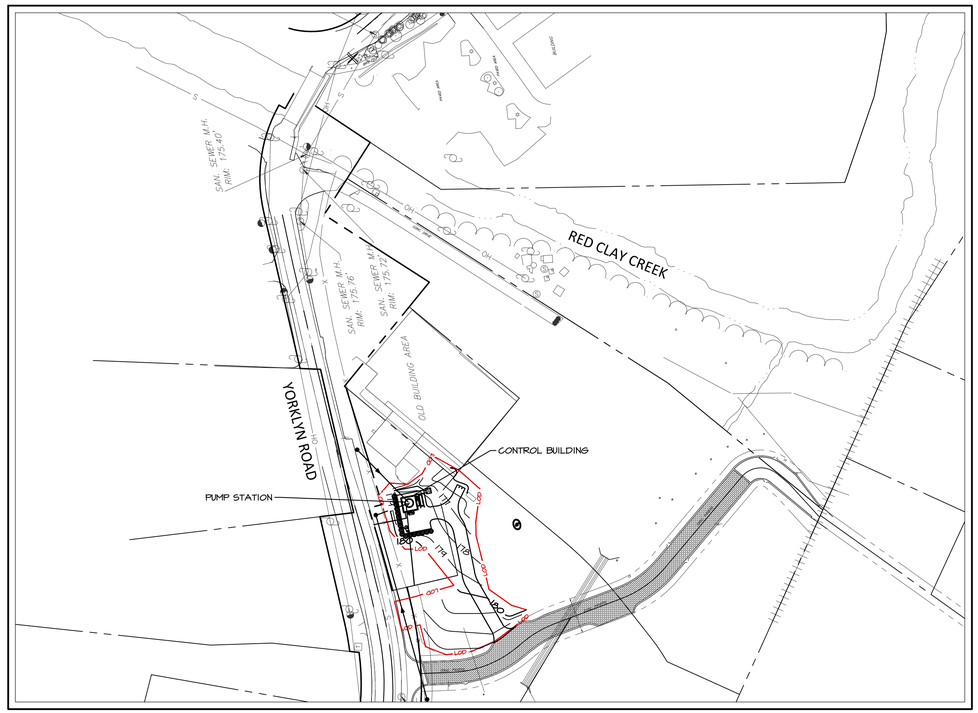
ARTESIAN WASTEWATER MANAGEMENT INC.

HOCKESSIN - NEW CASTLE COUNTY - DELAWARE

CALL BEFORE YOU DIG
MISS UTILITY OF DELMARVA
1-800-282-8555 (IN DE.)
PLEASE GIVE TWO WORKING DAYS
ADVANCE NOTICE

THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERETO APPURTENANT.

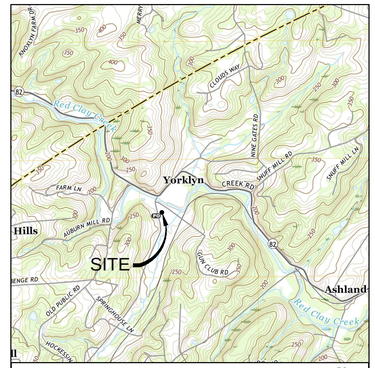


OVERALL SITE

SCALE: 1" = 100'

SCALE IN FEET: 1" = 100'

0 50 100 200 300



LOCATION MAP

SCALE: 1" = 2000'

OWNER

STATE OF DELAWARE,
DEPARTMENT OF NATURAL RESOURCES
89 KINGS HIGHWAY
DOVER, DE 19901

SOURCE OF TITLE

TAX ID # 0800100022
MICROFILM # 20110106-0001284, 01/06/2011

PROJECT SITE ADDRESS

3 GUN CLUB ROAD
HOCKESSIN, DE 19707

SURVEYOR OF RECORD

ARTESIAN WATER COMPANY, INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

GENERAL (G)

CIVIL (C)

PROCESS (P)

ELECTRICAL (E)

MECHANICAL (M)

STRUCTURAL (S)

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

743 S. BROAD ST.
LITITZ, PA 17543
(717) 626-7271
elagroup.com

ELA group, inc.
ENGINEERS + LANDSCAPE ARCHITECTS

ANDREW T. PRASER
LICENSE
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

FINAL DESIGN SET

-

SUBJECT:
COVER SHEET
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	AS SHOWN

DRAWING NO.
G-1

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sanitary Sewer\COVER.dwg - PLOTTED: Apr 23, 2021 11:22 am

PLAN NOTES

GENERAL NOTES:

1. THE PURPOSE OF THIS PLAN IS FOR THE CONSTRUCTION, INSTALLATION, AND START-UP OF THE AUBURN VALLEY PUMP STATION AND ASSOCIATED IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO: GRAVITY SEWER AND MANHOLES, WATER UTILITY, ELECTRIC UTILITY, BACKUP POWER, AND SITE IMPROVEMENTS.
2. ELA GROUP, INC. MAKES NO REPRESENTATIONS AS TO THE SUBSURFACE CONDITIONS OF THE PROJECT SITE INCLUDING DEPTH OF BEDROCK, GEOLOGICAL CONDITIONS, SOIL STABILITY, ETC.
3. NOTHING SHALL BE PLACED, PLANTED, SET OR PUT WITHIN THE AREA OF AN EASEMENT THAT WOULD ADVERSELY AFFECT THE FUNCTION OF THE EASEMENT OR CONFLICT WITH THE EASEMENT AGREEMENT.
4. THE OWNER/CONTRACTOR SHALL OBTAIN ALL APPROVALS AS NECESSARY FROM THE APPLICABLE BUILDING CODE AGENCY PRIOR TO CONSTRUCTION OF ANY BUILDINGS OR STRUCTURES.
5. ALL SITE CONSTRUCTION SHALL CONFORM TO THE DE BUILDING CODE & THE AMERICANS WITH DISABILITIES ACT (ADA).
6. DURING CONSTRUCTION OR UPON COMPLETION, THE STATE AND COUNTY SHALL HAVE THE RIGHT, BUT NOT THE DUTY, OF ACCESS AT ANY TIME, TO INSPECT AND MAINTAIN THE FACILITY AT THE PROPERTY OWNER'S EXPENSE IF THE OWNER SHOULD FAIL TO PROPERLY CONSTRUCT OR MAINTAIN THE FACILITY.
7. ANY REVISIONS TO THESE PLANS AFTER THE DATE OF THE LATEST REVISION SHALL NOT BE THE RESPONSIBILITY OF ELA GROUP, INC. SUBSTITUTIONS FOR ANY MATERIALS, OR CHANGES TO THE PLAN, REQUIRES APPROVAL OF ELA GROUP, INC., THE WASTEWATER UTILITY, OR THE AUTHORITY HAVING JURISDICTION (AS APPLICABLE).
8. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR DAMAGES OR COSTS INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.
9. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE INSURANCE AS REQUIRED IN THE SPECIFICATIONS TO PROTECT THE OWNER AND THE CONSULTING ENGINEER FROM ALL CLAIMS WHICH MAY ARISE OUT OF THE CONSTRUCTION. THE MINIMUM DECLARATION OF COVERAGE AND LIMITS OF LIABILITY ARE IN THE SPECIFICATIONS.
10. ALL CONDITIONS DEPICTED WHETHER ABOVE OR BELOW GRADE ARE TO THE BEST OF OUR KNOWLEDGE. ANY CONDITION THAT SHOULD DIFFER FROM THAT DEPICTED ON THE DRAWINGS DURING THE COURSE OF THE WORK SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER. THE CONTRACTOR SHALL CONFIRM ACTUAL FIELD MEASUREMENTS PRIOR TO ORDERING ANY MATERIALS.
11. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK REQUIRED TO BE COMPLETED AS OUTLINED IN THE PROJECT PLANS AND CONTRACT DOCUMENTS. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE DETAILS SHOWN ON THESE PLANS, THE PROJECT SPECIFICATIONS, AND WITH MANUFACTURER SPECIFICATIONS, REQUIREMENTS, OR RECOMMENDATIONS, WHICHEVER IS MORE STRINGENT.
12. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING CONSTRUCTION WITH APPROPRIATE AGENCIES THAT WILL BE AFFECTED OR HAVE JURISDICTION DURING CONSTRUCTION.
13. IF SUFFICIENT STAGING AREA IS NOT AVAILABLE ON SITE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING SUFFICIENT LAND FOR TEMPORARY TRAILERS, STORAGE AND STAGING AREAS. WRITTEN PERMISSION FROM PRIVATE PROPERTY OWNERS SHALL BE SUBMITTED TO THE OWNER BY THE CONTRACTOR.
14. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND CONSTRUCTED, INSTALLED, ERECTED, USED, OR CONNECTED ACCORDING TO THE MANUFACTURER'S SPECIFICATION, ALL APPLICABLE CODES, AS DIRECTED ON THE DRAWINGS AND SPECIFICATIONS, OR ACCORDING TO ACCEPTED ENGINEERING PRACTICE, WHICHEVER IS MORE STRINGENT. ANY DISCREPANCY BETWEEN ANY OF THE ABOVE AND THE WORK AS SHOWN ON THE DRAWINGS OR IN THE CONTRACT DOCUMENTS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
15. THE WORK DEPICTED ON THE DRAWINGS AND THE CONTRACT DOCUMENTS IS THE DESIRED FINISHED PRODUCT. THE MEANS AND METHODS OF CONSTRUCTION, AS WELL AS THE NECESSARY PRECAUTIONS TO BE EMPLOYED DURING CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR.
16. THE CONTRACTOR SHALL PROVIDE AND PAY FOR ALL MATERIALS, LABOR, TOOLS, EQUIPMENT, WATER, LIGHT, POWER, TRANSPORTATION, SUPERINTENDENCE, TEMPORARY CONSTRUCTION, TEMPORARY PAVEMENT, FINAL PAVEMENT, TESTING OF MATERIALS, ROAD SIGNS, TRAFFIC SIGNALS AND ALL OTHER SERVICES NECESSARY TO COMPLETE THIS PROJECT INCLUDING STARTUP AND PERFORMANCE TESTING. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY EQUIPMENT, PIPING, ENERGY, POWER, MANPOWER TO BYPASS THE PLANT AND COLLECTION AND CONVEYANCE SYSTEM FLOWS AND MAINTAIN TREATMENT DURING CONSTRUCTION.
17. THE CONTRACTOR SHALL OBTAIN ALL PERMITS AND APPROVALS REQUIRED FOR THE CONSTRUCTION OF THE PLANT IMPROVEMENTS.
18. ALL WORK DEPICTED ON OR INFERRED BY THESE DRAWINGS SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ANY AND ALL FEDERAL, STATE, AND LOCAL CODES OR REGULATIONS AND MANUFACTURERS SPECIFICATIONS AND REQUIREMENTS.
19. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO MAINTAIN SITE SECURITY DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL INSURE ACCESS TO EXISTING WASTEWATER TREATMENT PLANTS OR OTHER SENSITIVE FACILITIES IS AVAILABLE TO OWNERS PERSONNEL 24 HOURS PER DAY, 7 DAYS A WEEK.
20. WHENEVER A MATERIAL, ARTICLE OR PIECE OF EQUIPMENT IS IDENTIFIED ON THE CONTRACT DRAWINGS OR IN THE SPECIFICATIONS BY REFERENCE TO MANUFACTURERS' OR VENDORS' NAMES, TRADE NAMES, CATALOG NUMBERS, ETC., IT IS INTENDED TO ESTABLISH A STANDARD. A PROPOSED REPLACEMENT WILL BE CONSIDERED ACCEPTABLE PROVIDED THE MATERIAL, ARTICLE, OR EQUIPMENT SO PROPOSED, PERFORMS EQUIVALENTLY IN THE OPINION OF THE PROFESSIONAL ENGINEER. IT SHALL NOT BE PURCHASED OR INSTALLED BY THE CONTRACTOR WITHOUT THE PROFESSIONAL ENGINEER'S WRITTEN APPROVAL. THE CONTRACTOR SHALL AT HIS SOLE COST AND EXPENSE PROVIDE ALL INFORMATION NECESSARY TO DETERMINE THE PROPOSED ITEM IS EQUAL, INCLUDING PERFORMANCE, YEARLY MAINTENANCE AND OPERATIONAL COST, LIFE EXPECTANCY, SIZE, AVAILABILITY OF SPARE PARTS, WARRANTY, AND PERFORMANCE UNDER THE SAME CONDITIONS EXPECTED.
21. THE CONTRACTOR SHALL MEET THE REQUIREMENTS OF ARTICLE 11.0, SUBSTITUTE AND "OR-EQUAL" ITEMS, OF THE INSTRUCTIONS TO BIDDER AND ARTICLE 7.0, CONTRACTOR'S RESPONSIBILITIES, OF THE STANDARD GENERAL CONDITIONS FOR PROPOSED SUBSTITUTIONS.
22. THE CONTRACTOR SHALL TAKE THE NECESSARY STEPS TO PRESERVE ON-SITE AND OFF-SITE EXISTING CONDITIONS AND MINIMIZE ITEMS THAT MUST BE REPLACED. IF THE CONTRACTOR UNNECESSARILY DAMAGES SITE ITEMS DUE TO NEGLIGENCE OR UNSUITABLE CONSTRUCTION TECHNIQUES, THE CONTRACTOR SHALL RESTORE THOSE ITEMS IN KIND AT NO ADDITIONAL COST TO THE OWNER.
23. EXCAVATIONS OR TRENCHING WITHIN CLOSE PROXIMITY TO UNDERGROUND FACILITIES OR UTILITY POLES WILL REQUIRE PROTECTION TO PREVENT DAMAGE OR INTERRUPTION OF SERVICE TO UNDERGROUND FACILITIES. THE COST TO PROVIDE THIS PROTECTION WILL BE BORNE BY THE CONTRACTOR.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL EXCESS EXCAVATED MATERIAL AND UNSUITABLE FILL TO AN OFF-SITE LOCATION AT NO ADDITIONAL COST TO THE OWNER.
25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MEANS, METHODS, AND COSTS TO PROPERLY REMOVE AND DISPOSE OF ANY MATERIAL, UTILITY, OR EQUIPMENT SCHEDULED FOR DEMOLITION OR DEMOLITION, OR THAT MUST BE REMOVED TO ALLOW CONSTRUCTION OF THE PROPOSED IMPROVEMENTS. ALL DEMOLISHED, DECONSTRUCTED, AND REMOVED MATERIALS, UTILITIES, AND EQUIPMENT MUST BE PROPERLY DISPOSED OF OFF-SITE AT THE CONTRACTORS COST IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS.
26. REPAIR WORK SHALL BE PERFORMED TO THE SATISFACTION OF ARTESIAN WATER COMPANY, INC., ARTESIAN WASTEWATER MANAGEMENT INC., AND THE ENGINEER.
27. UPON COMPLETION OF THE PROJECT THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH THE NUMBER OF REPRODUCIBLE DRAWINGS LABELED "RED-LINED AS-BUILT DRAWINGS" INDICATED IN THE SPECIFICATIONS IN DIGITAL FORMAT SHOWING ACTUAL LOCATIONS AND ELEVATIONS OF ALL STRUCTURES, CONDUITS, EQUIPMENT, PIPELINES, VALVES AND APPURTENANCES. THE CONTRACTOR SHALL PROVIDE A NOTARIZED STATEMENT ON THE PLANS STATING THAT THE IMPROVEMENTS PROVIDED, CONSTRUCTED, AND INSTALLED BY THE CONTRACTOR WERE COMPLETED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. REFER TO THE SPECIFICATIONS FOR DETAILED REQUIREMENTS.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING. DEWATERING IS ANTICIPATED TO BE REQUIRED.
29. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PROVIDING TO OWNER SHORING PLANS FOR EXCAVATIONS WHOSE DEPTH REQUIRES DESIGN AND SIGN AND SEAL BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF DELAWARE.

SURVEYING AND BASEMAPPING

1. TOPOGRAPHIC DATA SHOWN HEREON WAS PREPARED BY ARTESIAN WATER COMPANY, INC., NEWARK, DE IN SEPTEMBER OF 2020. VERTICAL DATUM IS BASED ON NAVD 88. HORIZONTAL DATUM IS BASED ON DELAWARE STATE PLANE GROUND COORDINATES DAD 83 (2011).
2. THE BOUNDARY LINES PORTRAYED HEREON HAVE BEEN ESTABLISHED BASED SOLELY ON PHYSICAL EVIDENCE DISCOVERED IN THE FIELD IN CONJUNCTION WITH DETERMINATIONS DERIVED FROM SOURCE OF TITLE AND ADJACENT DEED RECORD INFORMATION.
3. DURING CONSTRUCTION, THE CONTRACTOR MUST HAVE IN HIS POSSESSION ON SITE, A SET OF CONSTRUCTION PLANS BEARING NEW CASTLE COUNTY'S STAMP OF APPROVAL.
4. CONSTRUCTION SHALL NOT DEVIATE FROM THE PLANS AND SPECIFICATIONS APPROVED BY NEW CASTLE COUNTY WITHOUT WRITTEN PERMISSION FROM NEW CASTLE COUNTY'S DEPARTMENT OF PUBLIC WORKS.

SANITARY SEWER AND WATER:

1. ALL UTILITIES HAVE BEEN LOCATED BASED ON EXISTING SURFACE APPURTENANCES AND IN ACCORDANCE WITH ACT 38 OF 1991. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND ALL EFFORTS SHALL BE UNDERTAKEN TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE TO THE UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. RESTORATION OF ALL EXISTING SURFACE IMPROVEMENTS DAMAGED OR ALTERED DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
2. PRIOR TO BEGINNING WORK ON THE SITE, THE CONTRACTOR MUST CALL MISS UTILITY TO HAVE ALL UNDERGROUND UTILITIES LOCATED AND MARKED IN THE FIELD.
3. WATER AND SEWER LINES MUST MAINTAIN A MINIMUM SEPARATION DISTANCE OF 18 INCHES VERTICALLY AND TEN (10') FEET HORIZONTALLY. OTHERWISE, CONCRETE ENCASEMENT OF THE SEWER LINE IS REQUIRED.
4. ALL WATER AND SEWER CONSTRUCTION SHALL BE SUBJECT TO THE INSPECTION BY ARTESIAN WATER COMPANY, INC., ARTESIAN WASTEWATER MANAGEMENT, INC., AND NEW CASTLE COUNTY PUBLIC WORKS.
5. CONTRACTOR MUST USE RESTRAINED JOINTS ON ALL FORCE MAINS PER MANUFACTURER SPECIFICATIONS.
6. ALL DUCTILE IRON FITTINGS AND CORRESPONDING LENGTHS OF PIPE SHALL BE RESTRAINED JOINTS, WHICH SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN ON THESE PLANS, THE PROJECT SPECIFICATIONS, AND WITH THE MANUFACTURER'S SPECIFICATIONS, WHICHEVER IS MORE STRINGENT.
7. THE DRAWINGS INDICATED THE PRESENCE OF BENDS AS PART OF THE NEW PIPE AND CONDUIT INSTALLATION. BENDS ARE SHOWN TO INDICATED THAT THE INSTALLATION WILL REQUIRE BENDS, BUT DO NOT INDICATE THE EXACT PLACEMENT OF BENDS. PRECISE LOCATION OF THE BENDS ARE TO BE DETERMINED IN THE FIELD, TO PROVIDE THE BEST LAYOUT TO AVOID CONFLICTS WITH EXISTING, PROPOSED, AND FUTURE INFRASTRUCTURE AND PROVIDE SUFFICIENT CLEARANCES AND SWEEPS TO ALLOW FOR EASE OF FUTURE OPERATION, MAINTENANCE, AND REPLACEMENT OF WIRES AND TUNING WITHIN. COST TO INCLUDE BENDS, FITTINGS, SUPPORTS AND OTHER MATERIALS REQUIRED TO MEET THIS REQUIREMENT SHALL BE BORNE BY THE CONTRACTOR.
8. TO MAINTAIN THE HORIZONTAL AND VERTICAL ALIGNMENT SHOWN ON THE PLANS, FORCE MAIN PIPE JOINTS MAY BE DEFLECTED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S REQUIREMENTS.
9. A MINIMUM OF 95% STANDARD PROCTOR COMPACTION IS REQUIRED FOR ALL SEWER SYSTEMS, STRUCTURES, AND PAVING PLACED ON FILL MATERIALS PLACED WITHIN, AND THAT TESTING MUST BE IN ACCORDANCE WITH THE APPROPRIATE AASHTO AND ASTM STANDARDS SUBMITTED TO THE ENGINEER.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ANY SETTLEMENT THAT OCCURS WITHIN BACKFILLED EXCAVATIONS AT NO ADDITIONAL COST TO THE OWNER, AS WELL AS FOR ANY DAMAGE TO OTHER FACILITIES NEAR THE AREAS OF SETTLED BACKFILL, FOR A MINIMUM OF 1-YEAR AFTER THE ENTIRE PROJECT HAS BEEN COMPLETED AND ACCEPTED BY THE ENGINEER AND OWNER.
11. A MINIMUM OF 4 FEET COVER REQUIRED OVER ALL SANITARY SEWER MAINS.
12. THE CONTRACTOR IS RESPONSIBLE FOR FIELD TESTING PER ARTESIAN'S REQUIREMENTS AND SHALL SUBMIT TESTING RESULTS TO THE ENGINEER PRIOR TO PAY APPLICATIONS FOR SAID WORK BEING SUBMITTED FOR APPROVAL.
13. ALL MATERIAL AND INSTALLATION SHALL CONFORM TO ARTESIAN WASTEWATER MANAGEMENT, INC. SPECIFICATIONS AND 10 STATES STANDARDS.
14. ALL ROADWAY PATCH SHALL BE STATE SPEC.
15. ALL CONCRETE CURB SHALL NOT BE DISTURBED UNLESS IT IS UNAVOIDABLE.
16. ALL CONCRETE SIDEWALK PATCHES SHALL BE 4" THICK WITH 4" OF CRUSHER RUN.
17. EXISTING UTILITIES ARE SHOWN IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND ALLOW FOR THEIR LOCATION.
18. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE AND ANY DAMAGE DONE TO THEM DUE TO HIS NEGLIGENCE SHALL BE IMMEDIATELY AND COMPLETELY REPAIRED AT HIS EXPENSE.
19. TEMPORARY SIDEWALK HAS TO BE PLACED WHERE EXISTING SIDEWALK IS REMOVED WITH BLACKTOP OR COLD PATCH. NO MORE THAN 500' CAN BE REMOVED WITHOUT PUTTING IN THE TEMPORARY SIDEWALK.
20. HYDRO-SEEDING AND SIFTED TOPSOIL SHALL BE USED FOR THE RESTORATION IN GRASS AREAS/LAWNS.

    GRASS SEED SPECIFICATIONS
    FULL SUN/SHADE MIX
    30% MONTAULK TALL FESCUE
    20% PERENNIAL RYEGRASS
    20% ANNUAL RYEGRASS
    20% CREEPING RED FESCUE
    10% KENTUCKY BLUE GRASS

21. ALL BUSHES, SHRUBS, TREES, AND OTHER VEGETATION WITHIN STATE RIGHT-OF-WAY REMOVED OR IMPACTED DURING CONSTRUCTION SHALL BE REPLACED IN KIND TO THE SATISFACTION OF DELDOT, OR AS APPROVED BY DELDOT INSPECTOR.
22. VACUUM EXCAVATION METHOD IS TO BE USED FOR TEST HOLES WHERE EXISTING UTILITIES CROSS PROPOSED WATER SERVICES IN PAVING.
23. IT IS THE CONTRACTORS RESPONSIBILITY TO STAKE OUT THE LIMITS OF EASEMENTS PER ANC STANDARDS.
24. CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF EXISTING UTILITIES AT ALL PROPOSED CROSSINGS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES AND/OR PROPOSED MODIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARTESIAN WASTEWATER MANAGEMENT, INC. INSPECTOR AT LEAST ONE WEEK PRIOR TO THE PLANNED COMMENCEMENT OF CONSTRUCTION.

STORM DRAINAGE:

1. IT IS THE CONTRACTORS RESPONSIBILITY TO REPAIR OR REPLACE ANY STORM DRAINAGE THAT IS DAMAGED DURING CONSTRUCTION.

OTHER UTILITIES:

1. LIGHTING WILL BE PROVIDED AS SHOWN ON THE PLANS BY THE CONTRACTOR AND SHALL MEET ALL NEW CASTLE COUNTY PUBLIC WORKS SPECIFICATIONS.

SEDIMENT AND EROSION CONTROL:

1. DISTURBED GRASS AREAS ARE TO BE RESTORED WITH TOPSOIL AND HYDRO-SEED, TO INCLUDE ADEQUATE IRRIGATION FOR A PERIOD OF FOUR WEEKS, AS REQUIRED. CONTRACTOR IS TO COMPLY WITH DELAWARE SEDIMENT AND EROSION CONTROL HANDBOOK FOR DEVELOPMENT FOR VEGETATIVE STABILIZATION PRACTICES.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN. DAILY INSPECTIONS SHALL BE PERFORMED BY THE CONTRACTOR'S BLUE CARD HOLDER. AT MINIMUM, WEEKLY INSPECTIONS SHALL BE PERFORMED BY THE CERTIFIED CONSTRUCTION REVIEWER (CCR).

TRAFFIC CONTROL:

1. CONTRACTOR IS RESPONSIBLE TO FOLLOW THE GUIDELINE SET FORTH IN THE LATEST VERSION OF THE PENNSYLVANIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND DIRECTIVES SET FORTH BY THE DELAWARE DEPARTMENT OF TRANSPORTATION.

CONTRACTOR NOTES:

1. THE CONTRACTOR SHALL INSPECT THE SITE AND VERIFY EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS TO CONFIRM WITH THE OWNER THE PROPOSED LOCATION OF ALL EXISTING IMPROVEMENTS TO BE RELOCATED.
3. CONTRACTOR IS REQUIRED TO COORDINATE PROVISIONS FOR NEW UTILITIES, OR PROVIDE TEMPORARY CONNECTIONS, IN ACCORDANCE WITH THE NEW WORK SCHEDULED TO BE COMPLETED FOR CONSTRUCTION.
4. CONTRACTOR IS RESPONSIBLE FOR ALL THE TRAFFIC BARRICADING AND OTHER TRAFFIC CONTROLS AS REQUIRED TO MAINTAIN OWNERS USE OF THE SITE DURING CONSTRUCTION OPERATIONS.
5. PROVIDE TEMPORARY TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS WHERE INDICATED ON DRAWINGS AND AS REQUIRED TO FACILITATE TRAFFIC MOVEMENTS FOR ALL TEMPORARY ROADWAYS, ACCESS DRIVES, PARKING AREAS, AND PERMANENT PAVEMENTS WHERE THE FINAL WEARING COURSE WILL NOT BE INSTALLED UNTIL A LATER CONSTRUCTION PHASE.
6. CONSTRUCTION OF ALL IMPROVEMENTS SHALL BE BASED ON ACTUAL FIELD STAKING BY A REGISTERED SURVEYOR OR PROFESSIONAL ENGINEER. THE CONTRACTOR SHALL NOT DEVIATE FROM THE GEOMETRY OR DIMENSIONS INDICATED ON THE PLAN WITHOUT APPROVAL OF THE ELA GROUP, MUNICIPALITY, OR THE AUTHORITY HAVING JURISDICTION. ALL BUILDINGS SHALL BE STAKED / CONSTRUCTED FROM THE STRUCTURAL PLANS.
7. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS FROM THE COUNTY RELATIVE TO CONSTRUCTION PROPOSED ON THIS PLAN PRIOR TO INITIATING ANY WORK COVERED BY THE PERMIT.
8. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE GRADING PLAN IS IMPLEMENTED CORRECTLY, AND THAT PROPER DRAINAGE IS PROVIDED DURING CONSTRUCTION.
9. ALL SPOT ELEVATIONS LOCATED ALONG ROADWAYS, ACCESS DRIVES, AND PARKING LOTS ARE BOTTOM OF CURB, UNLESS OTHERWISE NOTED.
10. IF FIELD CONDITIONS ARE DETERMINED TO BE DIFFERENT THAN SHOWN ON THIS PLAN, THE OWNER'S REPRESENTATIVE MUST BE NOTIFIED BEFORE PROCEEDING.
11. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AS-BUILT SURVEY OF THE CONSTRUCTED IMPROVEMENTS INCLUDING STORMWATER MANAGEMENT SYSTEM PLANS AND PROFILES.

CONSTRUCTION SEQUENCE NOTES:

1. CONTRACTOR SHALL BE REQUIRED TO COMPLETE ALL LINEAR GRAVITY SANITARY SEWER AND MANHOLE INSTALLATION THAT IS OUTSIDE OF THE PROJECT AREA LIMIT OF DISTURBANCE UNDER A SEPARATE MINOR LINEAR UTILITY PLAN PROVIDED BY THE ENGINEER AND APPROVED BY DNREC SEDIMENT AND STORMWATER. THIS MINOR LINEAR UTILITY WORK OUTSIDE THE PROJECT SITE LOD MUST BE COMPLETED, INCLUDING FINAL RESTORATION, PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES, INCLUDING EROSION AND SEDIMENT CONTROL INSTALLATION.

DELDOT NOTES:

1. AS CONSTRUCTION PROGRESSES DOWN THE ROAD DRIVEWAYS WILL BE CLOSED ONLY AS PIPE IS INSTALLED ACROSS THE DRIVEWAY. AS A DRIVEWAY IS PASSED TEMPORARY RESTORATION WILL BE MADE AND THE DRIVEWAY OPENED. FINAL RESTORATION OF ALL DRIVEWAYS WILL BE DONE BEFORE THE JOB IS COMPLETE.
2. WHEN CONSTRUCTION IS COMPLETE FINAL RESTORATION WILL TAKE PLACE.
3. CONCRETE SIDEWALK PATCHES SHALL BE 4" DEPTH CONCRETE ON 4" DEPTH GRADED AGGREGATE BASE COURSE. AT DRIVEWAY ENTRANCES, THESE DEPTHS SHALL BE INCREASED TO 6" CONCRETE ON 6" SABC.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE STATE INSPECTOR 24 HOURS PRIOR TO REQUESTS FOR RELEASE OF CONCRETE, ASPHALT, OR OTHER MATERIAL.
5. SIGNS FOR PEDESTRIAN DETOURS SHALL BE PLACED BY CONTRACTOR, AS APPROVED BY DELDOT SAFETY OFFICER. PEDESTRIAN DETOUR SIGN PLAN SHALL BE SUBMITTED TO DELDOT, AND APPROVED BY DELDOT IN WRITING PRIOR TO COMMENCEMENT OF WORK.
6. ALL WORK WITHIN THE STATE RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE MOST RECENT REVISION FO DELDOT STANDARD SPECIFICATIONS, DELDOT STANDARD CONSTRUCTION DETAILS, DELAWARE MUTCD, AND DELDOT UTILITIES MANUAL.
7. RIGHT-OF-WAY AND EASEMENT LINES SHOWN OF THESE PLANS ARE FOR ASSISTANCE IN INTERPRETING THE PLANS. THEY ARE NOT OFFICIAL. FOR OFFICIAL RIGHT-OF-WAY AND EASEMENT INFORMATION SEE APPROPRIATE RIGHT-OF-WAY PLATS.
8. VALVES SHALL NOT BE INSTALLED IN CONCRETE CURBS, DELDOT POLICY DISCOURAGES PLACEMENT OF VALVES IN SIDEWALK WITHIN STATE RIGHT-OF-WAY.

DELAWARE STATE FIRE MARSHAL SITE PLAN NOTES:

1. NAME OF BUILDING: AUBURN VALLEY PUMP STATION
2. ADDRESS: 3 GUN CLUB ROAD, HOCKESSIN, DE 19707
3. SPECIFIC COUNTY PLANNING DEPT. REFERENCE NUMBER: EXEMPT, NOT APPLICABLE.
4. OWNER'S NAME AND ADDRESS: STATE OF DELAWARE, 84 KINGS HWY, DOVER, DE 19901
5. DESIGN PROFESSIONAL'S NAME AND ADDRESS: ANDREW T. PROSSER, PE; ELA GROUP, INC. 123 S BROAD ST, LITITZ, PA 17543
6. INTENDED USE OF BUILDING: WASTEWATER PUMP STATION
7. NAME OF WATER SUPPLIER: ARTESIAN WATER COMPANY, INC.
8. MAXIMUM HEIGHT OF BUILDING: 16'4"
9. PROPOSED BUILDING CONSTRUCTION TYPE/CLASSIFICATION: CATEGORY III, CONCRETE SPLIT-FACED BLOCK
10. ALL FIRE LANES, FIRE HYDRANTS, AND FIRE DEPARTMENT CONNECTIONS SHALL BE MARKED IN ACCORDANCE WITH THE STATE FIRE PREVENTION REGULATIONS.

DELAWARE STATE FIRE MARSHAL BUILDING PLAN NOTES:

1. NAME OF BUILDING: AUBURN VALLEY PUMP STATION
2. ADDRESS: 3 GUN CLUB ROAD, HOCKESSIN, DE 19707
3. BUILDING WILL NOT BE PROTECTED BY AUTOMATIC SPRINKLER.
4. OWNER'S NAME AND ADDRESS: STATE OF DELAWARE, 84 KINGS HWY, DOVER, DE 19901
5. BUILDING DESIGN PROFESSIONAL'S NAME AND ADDRESS: MICHAEL H. SHEER, PE, 5E, 6 DICKINSON DRIVE, CHADDS FORD, PA 19317
6. INTENDED USE OF BUILDING AND NARRATIVE DESCRIPTION: UNMANNED WASTEWATER PUMP STATION W/ REMOTE OPERATION AND CONTROL, MAXIMUM NORMAL OCCUPANCY WILL BE 1 OPERATOR DAILY. IN EVENT OF MAINTENANCE, TWO OR THREE PEOPLE WOULD BE THE MAXIMUM EXPECTED OCCUPANCY.

REVISIONS PER:	DATE:	BY:
1. -	-	-
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4. -	-	-
5. -	-	-

ELA group, inc.
ENGINEERS + LANDSCAPE ARCHITECTS
743 S. BROAD ST.
LITITZ, PA 17543
(717) 626-7271
elagroup.com

ANDREW T. PROSSER — No. 18486 — DELAWARE LICENSED PROFESSIONAL ENGINEER

FINAL DESIGN SET

-

SUBJECT:
GENERAL PLAN NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	AS SHOWN

DRAWING NO.
G-2

SEDIMENT AND STORMWATER MANAGEMENT PLANS

FOR

NVF PUMP STATION

HOCKESSIN - NEW CASTLE COUNTY - DELAWARE

OWNERS CERTIFICATION

I _____, CERTIFY THAT ALL LAND CLEARING, CONSTRUCTION, AND DEVELOPMENT SHOULD BE DONE PURSUANT TO THE APPROVED PLAN AND THAT RESPONSIBLE PERSONNEL (I.E., BLUE CARD HOLDER) INVOLVED IN THE LAND DISTURBANCE WILL HAVE A CERTIFICATION OF TRAINING PRIOR TO INITIATION OF THE PROJECT, AT A DNREC SPONSORED OR APPROVED TRAINING COURSE FOR THE CONTROL OF EROSION AND SEDIMENT DURING CONSTRUCTION. IN ADDITION, I GRANT THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY THE RIGHT TO CONDUCT ONSITE REVIEWS, AND I UNDERSTAND MY RESPONSIBILITIES UNDER THE NPDES CONSTRUCTION GENERAL PERMIT, AS REFERENCED ON THIS COVERSHEET.

_____ OWNERS SIGNATURE

_____ OWNERS NAME

_____ OWNERS TITLE

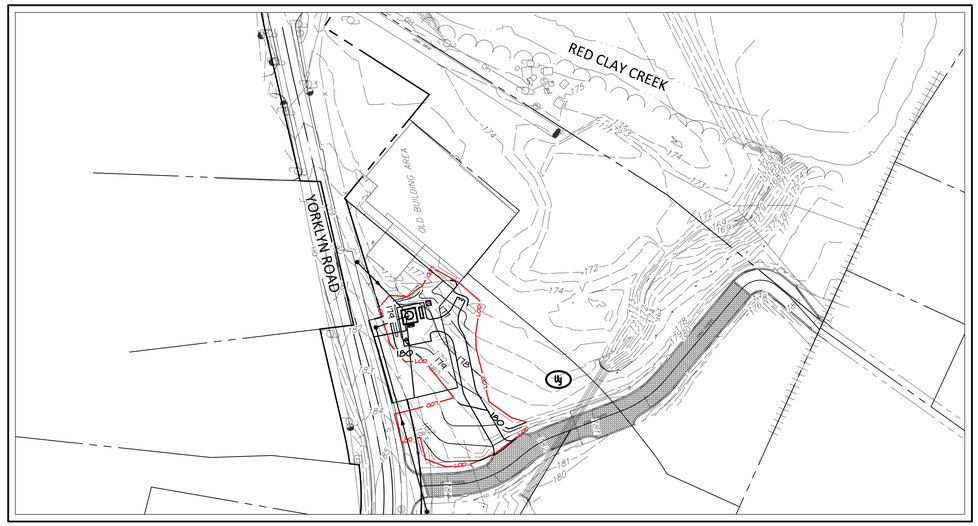
LICENSED PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED UNDER MY SUPERVISION AND TO THE BEST OF MY KNOWLEDGE COMPLIES WITH THE APPLICABLE STATE AND LOCAL REGULATIONS AND ORDINANCES.

_____ SIGNATURE

_____ NAME

_____ TITLE

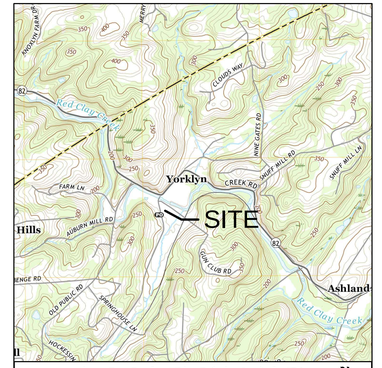


OVERALL SITE

SCALE: 1" = 100'

SCALE IN FEET: 1" = 100'

0 50 100 200 300



LOCATION MAP

SCALE: 1" = 2000'

SOURCE OF TITLE

TAX MAP ID : 08-004.00-022

SURVEYOR OF RECORD

ARTESIAN WATER COMPANY
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

OWNER

STATE OF DELAWARE
84 KINGS HIGHWAY
DOVER, DE 19901

WATERSHED

RED CLAY CREEK

PARCEL DATA

PROJECT TAX MAP ID NUMBER:	08-044.00-22
DNREC SEDIMENT AND STORMWATER PROGRAM NUMBER:	XXX
SITE ADDRESS:	3 GUN CLUB ROAD, HOCKESSIN, DE 19707
LATITUDE AND LONGITUDE:	39.80648, -75.675374
EXISTING SITE AREA:	0.49 ACRES
PROPOSED SITE AREA:	0.49 ACRES
EXISTING WETLAND AREA:	0 ACRES
PROPOSED CONDITION:	TOTAL BUILDING SQUARE FOOTAGE 443 SF;
	9,402 SF (0.22 ACRES) WITHIN PROPERTY
	18,735 SF (0.43 ACRES) OUTSIDE PROPERTY IN EASEMENT
PROPOSED TOTAL LIMIT OF DISTURBANCE:	TOTAL LIMIT OF DISTURBANCE = 28,137 SF (0.65 ACRES)

CONTACT DATA

OWNER: BROOKS CAHALL
STATE OF DELAWARE
84 KINGS HIGHWAY
DOVER, DE 19901
BROOKS.CAHALL@DELAWARE.GOV
PH. 302-734-4210

DEVELOPER: JONATHAN HAWKES, P.E.
ARTESIAN WATER COMPANY
664 CHURCHMANS ROAD
NEWARK, DE 19702
JHAWKES@ARTESIANWATER.COM
PH. 302-453-6900

DESIGNER: ANDREW PROSSER, P.E.
ELA GROUP, INC.
743 S. BROAD STREET
LITITZ, PA 17543
ATPROSSER@ELAGROUP.COM
PH. 717-626-7271

STANDARD SEDIMENT AND STORMWATER CONSTRUCTION NOTES:

a) THE DNREC SEDIMENT AND STORMWATER PROGRAM SHALL BE NOTIFIED IN WRITING 5 DAYS PRIOR TO COMMENCING WITH CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED STORMWATER MANAGEMENT PLAN.

b) REVIEW AND/OR APPROVAL OF THE SEDIMENT AND STORMWATER MANAGEMENT PLAN SHALL NOT RELIEVE THE CONTRACTOR FROM HIS OR HER RESPONSIBILITIES FOR COMPLIANCE WITH THE REQUIREMENTS OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM ERRORS OR OMISSIONS IN THE APPROVED PLAN.

c) IF THE APPROVED PLAN NEEDS TO BE MODIFIED, ADDITIONAL SEDIMENT AND STORMWATER CONTROL MEASURES MAY BE REQUIRED AS DEEMED NECESSARY BY DNREC OR THE DELEGATED AGENCY.

d) FOLLOWING SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED FOR ALL PERIMETER SEDIMENT CONTROLS, SOIL STOCKPILES, AND ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE WITHIN 14 CALENDAR DAYS UNLESS MORE RESTRICTIVE FEDERAL REQUIREMENTS APPLY.

e) ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL COMPLY WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

f) AT ANY TIME A DEWATERING OPERATION IS USED, IT SHALL BE PREVIOUSLY APPROVED BY THE AGENCY CONSTRUCTION SITE REVIEWER FOR A NON-EROSIVE POINT OF DISCHARGE, AND A DEWATERING PERMIT SHOULD BE APPROVED BY THE DNREC WELL PERMITTING BRANCH.

g) APPROVE PLANS REMAIN VALID FOR 5 YEARS FROM THE DATE OF APPROVAL.

h) POST CONSTRUCTION VERIFICATION DOCUMENTS SHALL BE SUBMITTED TO THE DEPARTMENT WITHIN 60-DAYS OF STORMWATER MANAGEMENT FACILITY COMPLETION.

i) APPROVAL OF A SEDIMENT AND STORMWATER MANAGEMENT PLAN DOES NOT GRANT OR IMPLY A RIGHT TO DISCHARGE STORMWATER RUNOFF. THE OWNER/DEVELOPER IS RESPONSIBLE FOR ACQUIRING ANY AND ALL AGREEMENTS, EASEMENTS, ETC. NECESSARY TO COMPLY WITH STATE DRAINAGE AND OTHER APPLICABLE LAWS.

j) THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHALL BE CHECKED DAILY AND ADJUSTED OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENT FROM LEAVING THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR ALTER MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.

k) BEFORE ANY EARTHWORK OR EXCAVATION TAKES PLACE, THE CONTRACTOR SHOULD CALL MISS UTILITY AT 811 OR 1-800-282-8555 ATLEAST 48 HOURS PRIOR TO CONSTRUCTION, TO HAVE ALL EXISTING UTILITIES MARKED ONSITE.

l) BEST AVAILABLE TECHNOLOGY (BAT) SHALL BE EMPLOYED TO MANAGE TURBID DISCHARGES IN ACCORDANCE WITH REQUIREMENTS OF 7 DEL.C.CH.60 AND THE CURRENT DELAWARE CONSTRUCTION GENERAL PERMIT (CGP).

m) DOCUMENTATION OF SOIL TESTING AND MATERIALS USED FOR TEMPORARY OR PERMANENT STABILIZATION INCLUDING BUT NOT LIMITED TO SOIL TEST RESULTS, SEED TAGS, SOIL AMENDMENT TAGS, ETC. SHALL BE PROVIDED TO THE DEPARTMENT TO VERIFY THAT THE PERMANENT OR TEMPORARY STABILIZATION HAS BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLAN.

n) THE DEPARTMENT MAY REQUIRE ADDITIONAL SOIL TESTING AND RE-APPLICATION OF PERMANENT OR TEMPORARY STABILIZATION IN ACCORDANCE WITH THE SPECIFICATIONS IN THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, OR ALTERNATIVE MEASURES THAT PROVIDE FUNCTIONAL EQUIVALENCY.

o) THE OWNER SHALL ACQUIRE THE SERVICES OF A THIRD PARTY CERTIFIED CONSTRUCTION REVIEWER (CCR) TO PERFORM WEEKLY CONSTRUCTION REVIEWS. SEDIMENT AND STORMWATER MANAGEMENT PLANS APPROVED BY THE DEPARTMENT SHALL HAVE A THIRD PARTY CCR.

LIST OF DRAWINGS

GRADING LEGEND

- 355 — PROPOSED CONTOUR
- 355 — EXISTING CONTOUR
- Headwall, Manhole, Inlet, Endwall, Pipe, Pipe — EXISTING STORM DRAINAGE PIPING
- HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP — PROPOSED STORM DRAINAGE PIPING
- Utility Pole — OH — Electric Meter — EM — EXISTING OVERHEAD ELECTRIC
- Utility Pole — UE — Electric Transformer — EXISTING UNDERGROUND ELECTRIC
- Utility Pole — UT — Manhole — Telephone Box — EXISTING UNDERGROUND TELEPHONE
- GV Gas Valve — G — GM Gas Meter — EXISTING GAS LINE
- C.O. Clean Out — S — Manhole — EXISTING SANITARY SEWER LINE
- FM — S — Manhole — EXISTING SANITARY FORCE MAIN
- WM Water Meter — W — WV Water Valve — Fire Hydrant — EXISTING WATER LINE
- × 354.05 — EXISTING SPOT GRADE
- + 352.50 — PROPOSED SPOT GRADE
- 5% — SLOPE GRADIENT AND DIRECTION
- LOD LOD — LIMIT OF DISTURBANCE

SOIL LEGEND

Uy — URBAN LAND, BEDROCK SUBSTRATUM

CALL BEFORE YOU DIG
MISS UTILITY OF DELMARVA
1-800-282-8555 (IN DE.)
PLEASE GIVE TWO WORKING DAYS
ADVANCE NOTICE

THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERETO APPURTENANT.

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

ELA group, inc.
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elagroup.com

ANDREW T. PROSSER
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

SUBJECT:
COVER SHEET AND GENERAL NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	AS SHOWN

DRAWING NO.
C-00

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sediment and Stormwater\COVER.dwg - PLOTTED: Apr 23, 2021 9:45 am

PLAN NOTES

GENERAL NOTES:

1. NO ONE SHALL SCALE FROM THESE PLANS TO CONSTRUCT OR LAYOUT ANY PART OF THIS PROJECT.
2. ELA GROUP, INC. MAKES NO REPRESENTATIONS AS TO THE SUBSURFACE CONDITIONS OF THE PROJECT SITE INCLUDING DEPTH OF BEDROCK, GEOLOGICAL CONDITIONS, SOIL STABILITY, ETC.
3. NOTHING SHALL BE PLACED, PLANTED, SET OR PUT WITHIN THE AREA OF AN EASEMENT THAT WOULD ADVERSELY AFFECT THE FUNCTION OF THE EASEMENT OR CONFLICT WITH THE EASEMENT AGREEMENT.
4. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR AND BEAR THE SOLE COST OF THE INSTALLATION OF ALL IMPROVEMENTS SHOWN ON THIS PLAN. ALL IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ALL NEW CASTLE COUNTY AND STATE OF DELAWARE REQUIREMENTS.
5. THE OWNER/DEVELOPER SHALL OBTAIN ALL APPROVALS AS NECESSARY FROM THE APPLICABLE BUILDING CODE AGENCY PRIOR TO CONSTRUCTION OF ANY BUILDINGS OR STRUCTURES.
6. DURING CONSTRUCTION OR UPON COMPLETION, THE NEW CASTLE COUNTY AND STATE OF DELAWARE SHALL HAVE THE RIGHT, BUT NOT THE DUTY, OF ACCESS AT ANY TIME, TO INSPECT AND MAINTAIN THE FACILITY AT THE PROPERTY OWNER'S EXPENSE IF THE OWNER SHOULD FAIL TO PROPERLY CONSTRUCT OR MAINTAIN THE FACILITY.
7. ANY REVISIONS TO THESE PLANS AFTER THE DATE OF THE LATEST REVISION SHALL NOT BE THE RESPONSIBILITY OF ELA GROUP, INC. SUBSTITUTIONS FOR ANY MATERIALS, OR CHANGES TO THE PLAN, REQUIRES APPROVAL OF ELA GROUP, INC., THE DELEGATED AGENCY HAVING JURISDICTION (AS APPLICABLE).

SURVEYING AND BASEMAPPING

1. THE FIELD SURVEY BY ARTESIAN WATER COMPANY, INC. IS FOR CONSTRUCTION PURPOSES ONLY AND IS NOT TO BE USED TO ESTABLISH THE LOCATION OF ANY PROPERTY BOUNDARIES.
2. TOPOGRAPHIC DATA SHOWN HEREON WAS PREPARED BY ARTESIAN WATER COMPANY, INC, IN 2020. VERTICAL DATUM IS BASED ON NAVD 88. HORIZONTAL DATUM IS BASED ON DELAWARE STATE PLANE GROUND COORDINATES NAD 83 (2011).
3. DURING CONSTRUCTION, THE CONTRACTOR MUST HAVE IN HIS POSSESSION ON SITE, A SET OF CONSTRUCTION PLANS BEARING NEW CASTLE COUNTY'S STAMP OF APPROVAL.
4. CONSTRUCTION SHALL NOT DEVIATE FROM THE PLANS AND SPECIFICATIONS APPROVED BY NEW CASTLE COUNTY WITHOUT WRITTEN PERMISSION FROM NEW CASTLE COUNTY'S DEPARTMENT OF SPECIAL SERVICES.

DEMOLITION NOTES

1. VERIFY ITEMS SCHEDULED FOR DEMOLITION AND LIMITS OF DEMOLITION PRIOR TO PROCEEDING WITH THE WORK.
2. CAP/ABANDON EXISTING UTILITIES IN ACCORDANCE WITH UTILITY COMPANIES AND/OR AUTHORITIES HAVING JURISDICTION.
3. EXISTING UTILITIES TO BE ABANDONED MAY REMAIN IN-PLACE WHERE THEY WILL NOT INTERFERE WITH FINISHED WORK. ACCURATELY NOTE ALL UTILITIES ABANDONED IN-PLACE ON CONTRACTOR'S RECORD DRAWINGS.
4. BURNING OF TREES, SHRUBS, BRUSH AND OTHER MATERIALS ON-SITE PERMITTED ONLY WHEN APPROVED BY LOCAL AND OTHER REGULATORY AGENCIES HAVING JURISDICTION. COORDINATE LOCATION OF BURN PITS WITH OWNER.
5. LOCATION AND LIMIT OF TEMPORARY CONSTRUCTION FENCE IS APPROXIMATE. PROVIDE AS REQUIRED FOR THE WORK, TO ACCOMMODATE WORK OF OTHER TRADES, AND AS REQUIRED TO REDUCE POTENTIAL ACCIDENTAL TRESPASS. PROVIDE VEHICULAR ACCESS GATES AND MAN GATES WHERE REQUIRED FOR ACCESS (COORDINATE WITH CONSTRUCTION ENTRANCE LOCATIONS SHOWN ON EROSION AND SEDIMENT CONTROL PLAN).
6. PROVIDE TEMPORARY TRUNK AND ROOT PROTECTION FOR ALL EXISTING SPECIMEN TREES TO REMAIN OR WHERE TREES TO REMAIN COULD BE DAMAGED BY CONSTRUCTION ACTIVITIES.
7. REMOVE AND DISPOSE OF DEBRIS, INCLUDING, BUT NOT LIMITED TO TIRES, GLASS, SHEET METAL, DERELICT AUTOMOBILE(S) AND HOUSEHOLD APPLIANCES. LIMITS, COMPOSITION AND LOCATION OF DEBRIS APPROXIMATE. CONTRACTOR TO VERIFY IN FIELD AND SECURE ALL PERMITS NECESSARY FOR PROPER DISPOSAL.

SANITARY SEWER AND WATER:

1. ALL UTILITIES HAVE BEEN LOCATED BASED ON EXISTING SURFACE APPURTENANCES AND IN ACCORDANCE WITH ACT 38 OF 1991. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS PRIOR TO THE START OF ANY CONSTRUCTION. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF EXISTING UTILITIES AND ALL EFFORTS SHALL BE UNDERTAKEN TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE TO THE UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. RESTORATION OF ALL EXISTING SURFACE IMPROVEMENTS DAMAGED OR ALTERED DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
2. PRIOR TO BEGINNING WORK ON THE SITE, THE CONTRACTOR MUST PROVIDE A ONE CALL TO HAVE ALL UNDERGROUND UTILITIES LOCATED AND MARKED IN THE FIELD.
3. THE SITE IS SERVED BY PUBLIC SEWER. ALL DESIGN, CONSTRUCTION AND PERMITTING SHALL BE DONE PER THE REQUIREMENTS OF THE SEWER AUTHORITY THAT WERE DULY ADOPTED AND APPROVED BY THE AUTHORITY AND IN FULL FORCE AND EFFECT ON THE DATE OF CONSTRUCTION.
4. THE SITE IS SERVED BY PUBLIC WATER. ALL DESIGN, CONSTRUCTION AND PERMITTING SHALL BE DONE PER THE REQUIREMENTS OF THE WATER AUTHORITY THAT WERE DULY ADOPTED AND APPROVED BY THE DEPARTMENT AND IN FULL FORCE AND EFFECT ON THE DATE OF CONSTRUCTION
5. WATER AND SEWER LINES MUST MAINTAIN A MINIMUM SEPARATION DISTANCE OF 18 INCHES VERTICALLY AND TEN (10') FEET HORIZONTALLY. OTHERWISE, CONCRETE ENCASEMENT OF THE SEWER LINE IS REQUIRED.
6. ALL CONNECTIONS TO THE EXISTING SANITARY MANHOLES SHALL BE CORE DRILLED AND PROPERLY SEALED WITH WATER-TIGHT JOINTS OR CONSTRUCTED PER THE SEWER AUTHORITY STANDARDS.

STORMWATER MANAGEMENT NOTES

1. NOTHING SHALL BE PLACED, PLANTED, SET, OR PUT WITHIN THE AREA OF A DRAINAGE EASEMENT OR STORM DRAINAGE FACILITY THAT COULD ADVERSELY AFFECT THE FUNCTION OF THE EASEMENT, ANY EASEMENT AGREEMENT, OR THE STORM DRAINAGE FACILITY.
2. THE DELEGATED AGENCY SHALL HAVE THE RIGHT TO: ACCESS THE SITE TO INSPECT STORM WATER FACILITIES AT ANY TIME; REQUIRE THAT THE LAND OWNER TAKE CORRECTIVE MEASURES AND ASSIGN THE LAND OWNER REASONABLE TIME PERIODS FOR ANY NECESSARY ACTION; AND AUTHORIZE MAINTENANCE TO BE DONE AND LIEN ALL COSTS OF ALL WORK AGAINST THE PROPERTIES OF THE PRIVATE ENTITY RESPONSIBLE FOR MAINTENANCE. THIS MAY BE DONE SHOULD THE OWNER FAIL TO PROPERLY MAINTAIN SUCH FACILITIES IN GOOD WORKING CONDITION.
3. ELA GROUP, INC. WILL PREPARE A POST CONSTRUCTION STORMWATER MANAGEMENT (PCSM) REPORT AS PART OF THE SUPPORTING DOCUMENTATION FOR THE PROPOSED IMPROVEMENTS AS DOCUMENTED ON THESE PLANS TO ADDRESS APPLICABLE COUNTY, STATE, AND MUNICIPAL REQUIREMENTS.

STORMWATER MANAGEMENT CONSTRUCTION NOTES

1. FINAL GRADING AND STORMWATER DISCHARGE FROM SITE IMPROVEMENTS SHALL ENSURE THE APPROVED WATERSHED/DRAINAGE AREAS ARE DIRECTED TO THE COLLECTION, CONVEYANCE, AND STORMWATER MANAGEMENT FACILITIES AS PER THE APPROVED DESIGN. THE APPROVED WATERSHED/DRAINAGE AREAS MAPPING ARE LOCATED WITHIN THE PLAN SET AND/OR WITHIN THE POST CONSTRUCTION STORMWATER MANAGEMENT REPORT. ON-SITE DRAINAGE AREAS FOR EXISTING CONDITIONS HAVE BEEN DETERMINED/DELINEATED BASED UPON TOPOGRAPHIC INFORMATION PROVIDED BY OTHERS. IF ON-SITE DRAINAGE CONDITIONS DIFFER THAN WHAT IS REPRESENTED ON THE PLANS, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DESIGN ENGINEER.
2. THE CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AWAY FROM ALL BUILDINGS, INCLUDING OVERLAND FLOWS, DISCHARGE FROM ROOF DOWNSPOUTS, AND OVERFLOW SYSTEMS.
3. FOR ANY FIELD REVISIONS, CHANGES, OR DEVIATIONS FROM THE APPROVED PLANS, THE APPLICANT MUST OBTAIN APPROVAL FROM THE DELEGATED AGENCY AND RESPONSIBLE PROFESSIONAL SITE CONSULTANT PRIOR TO PROCEEDING WITH SUCH REVISION(S).

EROSION AND SEDIMENT CONTROL NOTES

1. SOILS INFORMATION SHOWN ON THE PLANS IS BASED UPON MAPPING AND INFORMATION PROVIDED FROM THE WEB SOIL SURVEY (HTTPS://WEBSOILSURVEY.SC.EGOV.USDA.GOV), UNLESS OTHERWISE NOTED. A QUALIFIED GEOTECHNICAL PROFESSIONAL SHALL BE CONSULTED FOR ALL SOIL-RELATED REQUIREMENTS INCLUDING LIMITATIONS, ISSUES, AND RESOLUTIONS INCLUDING UNSUITABLE SOILS, SUB SURFACE SUBSIDENCE, ETC.

GEOTECHNICAL STORMWATER NOTES:

1. ELA GROUP, INC. MAKES NO REPRESENTATIONS AS TO THE SUBSURFACE CONDITIONS OF THE PROJECT SITE INCLUDING DEPTH OF BEDROCK, GEOLOGICAL AND/OR ENVIRONMENTAL CONDITIONS, SOIL STABILITY, ETC.
2. THE DELEGATED AGENCY AND THE GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD SHALL BE NOTIFIED IN THE EVENT OF SUBSURFACE SUBSIDENCE ACTIVITY INCLUDING SINKHOLES AND ALL OTHER UNSUITABLE SUBSURFACE CONDITIONS IF ENCOUNTERED DURING THE CONSTRUCTION OF THE STORMWATER MANAGEMENT FACILITIES. A LICENSED PROFESSIONAL GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL BE ENGAGED TO INVESTIGATE ALL UNSUITABLE SITE CONDITIONS AS IDENTIFIED ABOVE INCLUDING THE PREPARATION OF STABILIZATION PROCEDURES, DIRECTING THE STABILIZATION WORK, AND MAKING RECOMMENDATIONS FOR CONSTRUCTION TECHNIQUES/PROCEDURES AND DESIGN MODIFICATIONS THAT WILL REDUCE THE POTENTIAL FOR FURTHER UNSUITABLE CONDITIONS AND POTENTIAL SUB SURFACE SUBSIDENCE.
3. AN ABBREVIATED GEOTECHNICAL REPORT WAS PERFORMED BY INGRAM ENGINEERING SERVICES, INC., DATED; FEBRUARY 25, 2021. THE RECOMMENDATIONS AND DOCUMENTATION PROVIDED WITHIN THE GEOTECHNICAL REPORT SHALL BE STRICTLY ADHERED TO, UNLESS OTHERWISE APPROVED BY THE GEOTECHNICAL PROFESSIONAL.

CONTRACTOR NOTES:

1. THE CONTRACTOR SHALL INSPECT THE SITE AND VERIFY EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS TO CONFIRM WITH THE OWNER THE PROPOSED LOCATION OF ALL EXISTING IMPROVEMENTS TO BE RELOCATED.
3. CONTRACTOR IS REQUIRED TO COORDINATE PROVISIONS FOR NEW UTILITIES, OR PROVIDE TEMPORARY CONNECTIONS, IN ACCORDANCE WITH THE NEW WORK SCHEDULED TO BE COMPLETED FOR CONSTRUCTION.
4. CONTRACTOR IS RESPONSIBLE FOR ALL THE TRAFFIC BARRICADING AND OTHER TRAFFIC CONTROLS AS REQUIRED TO MAINTAIN OWNERS USE OF THE SITE DURING CONSTRUCTION OPERATIONS.
5. PROVIDE TEMPORARY TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS WHERE INDICATED ON DRAWINGS AND AS REQUIRED TO FACILITATE TRAFFIC MOVEMENTS FOR ALL TEMPORARY ROADWAYS, ACCESS DRIVES, PARKING AREAS, AND PERMANENT PAVEMENTS WHERE THE FINAL WEARING COURSE WILL NOT BE INSTALLED UNTIL A LATER CONSTRUCTION PHASE.
6. CONSTRUCTION OF ALL IMPROVEMENTS SHALL BE BASED ON ACTUAL FIELD STAKING BY A REGISTERED SURVEYOR OR PROFESSIONAL ENGINEER. THE CONTRACTOR SHALL NOT DEVIATE FROM THE GEOMETRY OR DIMENSIONS INDICATED ON THE PLAN WITHOUT APPROVAL OF THE ELA GROUP, THE DELEGATED AGENCY, OR THE AUTHORITY HAVING JURISDICTION. ALL BUILDINGS SHALL BE STAKED / CONSTRUCTED FROM THE ARCHITECTURAL PLANS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS RELATIVE TO CONSTRUCTION PROPOSED ON THIS PLAN PRIOR TO INITIATING ANY WORK COVERED BY THE PERMIT.
8. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE GRADING PLAN IS IMPLEMENTED CORRECTLY, AND THAT PROPER DRAINAGE IS PROVIDED DURING CONSTRUCTION.
9. ALL SPOT ELEVATIONS LOCATED ALONG ROADWAYS, ACCESS DRIVES, AND PARKING LOTS ARE BOTTOM OF CURB, UNLESS OTHERWISE NOTED.
10. IF FIELD CONDITIONS ARE DETERMINED TO BE DIFFERENT THAN SHOWN ON THIS PLAN, THE OWNER'S REPRESENTATIVE MUST BE NOTIFIED BEFORE PROCEEDING.
11. THE CONTRACTOR IS RESPONSIBLE TO INSTALL THE CURB RAMPS AND DRIVEWAY APRONS TO THE LATEST ADA AND/OR DELDOT STANDARDS AT THE TIME OF CONSTRUCTION.
12. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AS-BUILT SURVEY OF THE CONSTRUCTED IMPROVEMENTS INCLUDING STORMWATER MANAGEMENT SYSTEM PLANS AND PROFILES.

DELAWARE STATE FIRE MARSHAL SITE PLAN NOTES

1. NAME OF BUILDING: AUBURN VALLEY PUMP STATION
2. ADDRESS: 3 GUN CLUB ROAD, HOCKESSIN, DE 19707
3. SPECIFIC COUNTY PLANNING DEPT. REFERENCE NUMBER: EXEMPT
4. OWNER'S NAME AND ADDRESS: STATE OF DELAWARE, 89 KINGS HWY, DOVER, DE 19901
5. DESIGN PROFESSIONAL'S NAME AND ADDRESS: ANDREW T. PROSSER, PE; ELA GROUP, INC. 723 S BROAD ST, LITITZ, PA 17543
6. INTENDED USE OF BUILDING: WASTEWATER PUMP STATION
7. NAME OF WATER SUPPLIER: ARTESIAN WATER COMPANY, INC.
8. MAXIMUM HEIGHT OF BUILDING: ___FT
9. PROPOSED BUILDING CONSTRUCTION TYPE/CLASSIFICATION: CATEGORY III
10. ALL FIRE LANES, FIRE HYDRANTS, AND FIRE DEPARTMENT CONNECTIONS SHALL BE MARKED IN ACCORDANCE WITH THE STATE FIRE PREVENTION REGULATIONS.

DELAWARE STATE FIRE MARSHAL BUILDING PLAN NOTES

1. NAME OF BUILDING: AUBURN VALLEY PUMP STATION
2. ADDRESS: 3 GUN CLUB ROAD, HOCKESSIN, DE 19707
3. BUILDING WILL NOT BE PROTECTED BY AUTOMATIC SPRINKLER.
4. OWNER'S NAME AND ADDRESS: STATE OF DELAWARE, 89 KINGS HWY, DOVER, DE 19901
5. DESIGN PROFESSIONAL'S NAME AND ADDRESS:
6. INTENDED USE OF BUILDING AND NARRATIVE DESCRIPTION: UNMANNED WASTEWATER PUMP STATION W/ REMOTE OPERATION AND CONTROL

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

ELA group, inc.
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743 S. BROAD ST.
LITITZ, PA 17543
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elagroup.com

ANDREW T. PROSSER
LICENSED
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

SUBJECT:
NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	AS SHOWN

DRAWING NO.
C-01

EXISTING LEGEND

- ADJOINER PROPERTY LINE
- PROPERTY LINE (Iron Pin, Rebar / Concrete Monument)
- RIGHT-OF-WAY LINE
- CENTERLINE
- EASEMENTS
- INDEX CONTOUR (355)
- INTERMEDIATE CONTOUR (352)
- SPOT ELEVATION (X 391.0)
- CURB LINE
- EDGE OF PAVEMENT (E.O.P.)
- MIN. BLDG SETBACK LINE
- OVERHEAD ELECTRIC (Utility Pole, OH, Electric Meter, EM)
- UNDERGROUND ELECTRIC (Utility Pole, UE, Electric Transformer, ET)
- UNDERGROUND TELEPHONE (Utility Pole, UT, Manhole, T, Telephone Box, TB)
- GAS LINE (Gas Valve, GV, G, Gas Meter, GM)
- SANITARY SEWER LINE (Clean Out, C.O., S, Manhole)
- SANITARY FORCE MAIN (FM, Manhole)
- WATER LINE (Water Meter, WM, W, Water Valve, WV, Fire Hydrant)
- STORM DRAINAGE PIPING (Headwall, D, Manhole, Inlet, Endwall, Rip Rap)
- FENCE
- ZONING LINE
- GUIDE RAIL
- EDGE OF WATER (STREAM)
- FEMA 100 YEAR FLOODPLAIN
- TREE LINE
- SIGN
- WELL
- LIGHT POLE
- GROUND LIGHT
- ROOF DRAIN (R.D.)
- MAILBOX (MB)
- BOLLARD
- REFLECTOR POST
- DECIDUOUS TREES
- CONIFEROUS TREE
- TRAFFIC SIGNAL BOX
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL MAST
- LOD — LOD — LIMIT OF DISTURBANCE

NORTH

SCALE IN FEET: 1" = 20'

0 10 20 40 60

REVISIONS PER:	DATE:	BY:
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EA group, inc.
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LITITZ, PA 17543
(717) 626-7271
elagroup.com

ANDREW T. PROCTOR
LICENSED
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

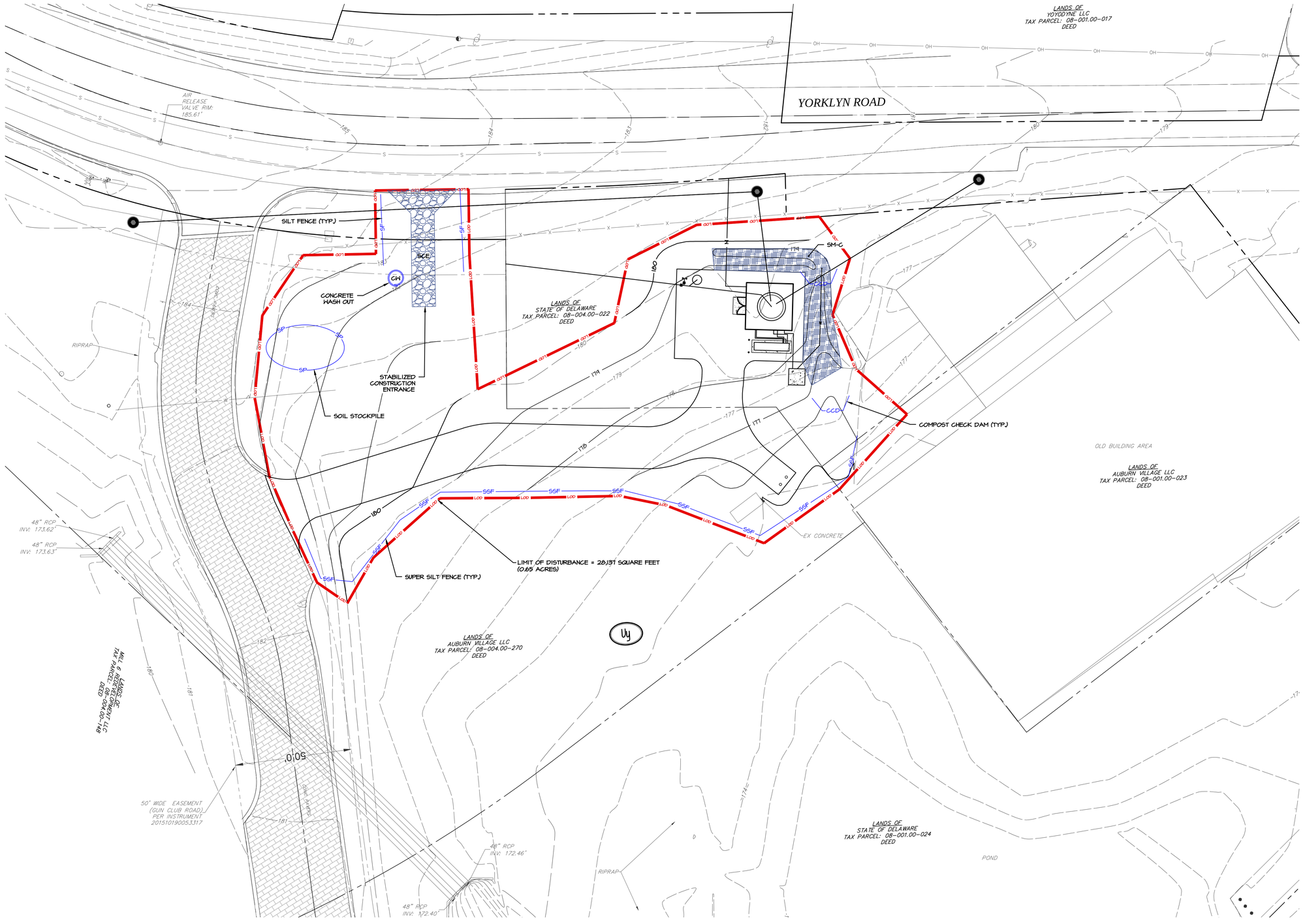
SUBJECT:
PRE CONSTRUCTION SITE STORMWATER MANAGEMENT PLAN / EXISTING CONDITIONS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1" = 20'

DRAWING NO.
C-02

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sediment and Stormwater\Pre Construction Site Plan.dwg - PLOTTED: Apr 23, 2021 10:13 am



GRADING LEGEND

- 355 — PROPOSED CONTOUR
- 355 — EXISTING CONTOUR
- HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP — EXISTING STORM DRAINAGE PIPING
- HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP — PROPOSED STORM DRAINAGE PIPING
- UTILITY POLE, OH, ELECTRIC METER, EM — EXISTING OVERHEAD ELECTRIC
- UTILITY POLE, UE, ELECTRIC TRANSFORMER, ET — EXISTING UNDERGROUND ELECTRIC
- UTILITY POLE, UT, MANHOLE, TELEPHONE BOX, TB — EXISTING UNDERGROUND TELEPHONE
- GV, GAS VALVE; C, GM, GAS METER — EXISTING GAS LINE
- CO, CLEAN OUT; S, MANHOLE — EXISTING SANITARY SEWER LINE
- FM, MANHOLE — EXISTING SANITARY FORCE MAIN
- WM, WATER METER; W, WATER VALVE; WV, FIRE HYDRANT — EXISTING WATER LINE
- × 354.05 — EXISTING SPOT GRADE
- + 35250 — PROPOSED SPOT GRADE
- 5% — SLOPE GRADIENT AND DIRECTION
- LOD — LIMIT OF DISTURBANCE
- SSF — SUPER SILT FENCE
- SF — SILT FENCE
- SP — STOCK PILE
- CCD — COMPOST CHECK DAM
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- SM-C — SLOPE MATTING CHANNEL
- CH — CONCRETE WASH OUT
- Uc — SOIL LABEL

SCALE IN FEET: 1" = 20'

0 10 20 40 60

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LITITZ, PA 17543
(717) 626-7271
elagroup.com

ANDREW T. PROSSER
LICENSED
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

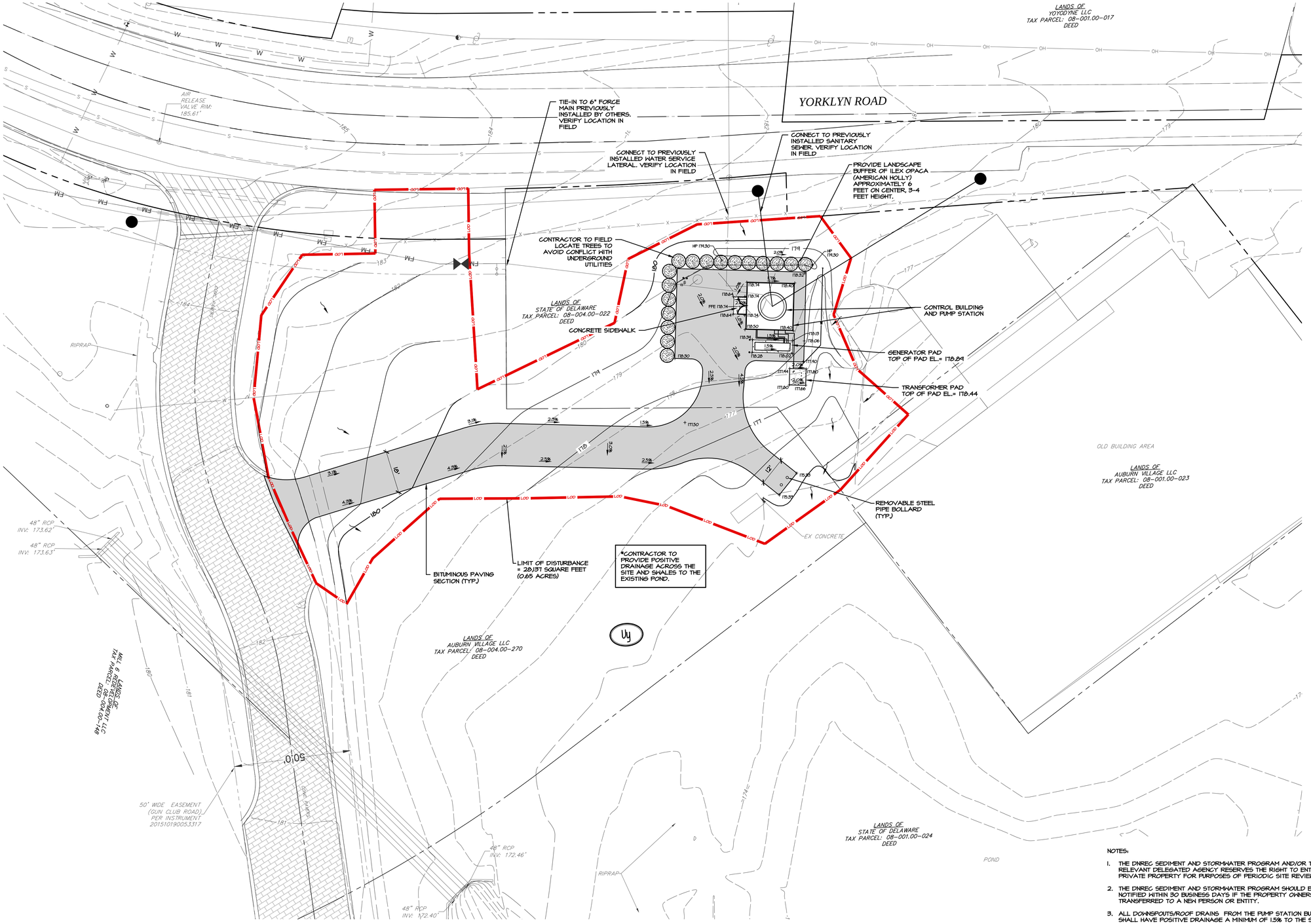
SUBJECT:
CONSTRUCTION SITE STORMWATER MANAGEMENT PLAN / ESC PLAN
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1" = 20'

DRAWING NO.
C-03

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sediment and Stormwater\Construction Site Plan.dwg - PLOTTED: Apr 23, 2021 9:42 am



GRADING LEGEND

- 355 — PROPOSED CONTOUR
- 355 — EXISTING CONTOUR
- EXISTING STORM DRAINAGE PIPING (Headwall, Manhole, Inlet, Endwall, Rip Rap)
- PROPOSED STORM DRAINAGE PIPING (HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP)
- OH — EXISTING OVERHEAD ELECTRIC (Utility Pole, Electric Meter)
- OHE — PROPOSED OVERHEAD ELECTRIC (UTILITY POLE, TRANSFORMER)
- UE — EXISTING UNDERGROUND ELECTRIC (Utility Pole, Electric Transformer)
- UE — PROPOSED UNDERGROUND ELECTRIC (UTILITY POLE, TRANSFORMER)
- UT — EXISTING UNDERGROUND TELEPHONE (Utility Pole, Manhole, Telephone Box)
- G — EXISTING GAS LINE (Gas Valve, Gas Meter)
- G — PROPOSED GAS LINE (GAS VALVE, GAS METER)
- S — EXISTING SANITARY SEWER LINE (Clean Out, Manhole)
- SAN — PROPOSED SANITARY SEWER LINE (MANHOLE, CLEANOUT)
- FM — EXISTING SANITARY FORCE MAIN (Manhole)
- FM — PROPOSED SANITARY FORCE MAIN (MANHOLE)
- W — EXISTING WATER LINE (Water Meter, Water Valve, Fire Hydrant)
- W — PROPOSED GAS LINE (WATER VALVE, FIRE HYDRANT)
- x 354.05 — EXISTING SPOT GRADE
- + 352.50 — PROPOSED SPOT GRADE
- 5% — SLOPE GRADIENT AND DIRECTION
- LOD — LIMIT OF DISTURBANCE
- PROPERTY LINE
- CENTERLINE
- RIGHT OF WAY LINE
- CONCRETE
- BITUMINOUS PAVING
- FLOW DIRECTION

NORTH

SCALE IN FEET: 1" = 20'

0 10 20 40 60

NOTES:

1. THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY RESERVES THE RIGHT TO ENTER PRIVATE PROPERTY FOR PURPOSES OF PERIODIC SITE REVIEW.
2. THE DNREC SEDIMENT AND STORMWATER PROGRAM SHOULD BE NOTIFIED WITHIN 30 BUSINESS DAYS IF THE PROPERTY OWNERSHIP IS TRANSFERRED TO A NEW PERSON OR ENTITY.
3. ALL DOWNSPOUTS/ROOF DRAINS FROM THE PUMP STATION BUILDING SHALL HAVE POSITIVE DRAINAGE A MINIMUM OF 1.5% TO THE SWALE.
4. CONCRETE SIDEWALK AT BUILDING ENTRANCE IS TO BE FLUSH WITH BUILDING. CONTRACTOR TO ENSURE POSITIVE DRAINAGE THROUGH THE SITE IN ALL LOCATIONS.

REVISIONS PER:	DATE:	BY:
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4. -	-	-
5. -	-	-

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ANDREW T. PROSSER — LICENSED — No. 18486 — DELAWARE PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

SUBJECT:
POST CONSTRUCTION SITE STORMWATER MANAGEMENT
GRADING / UTILITY / LANDSCAPE PLAN
FOR:
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1" = 20'

DRAWING NO.
C-04

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sediment and Stormwater\Post Construction Site Plan.dwg - PLOTTED: Apr 23, 2021 10:07 am

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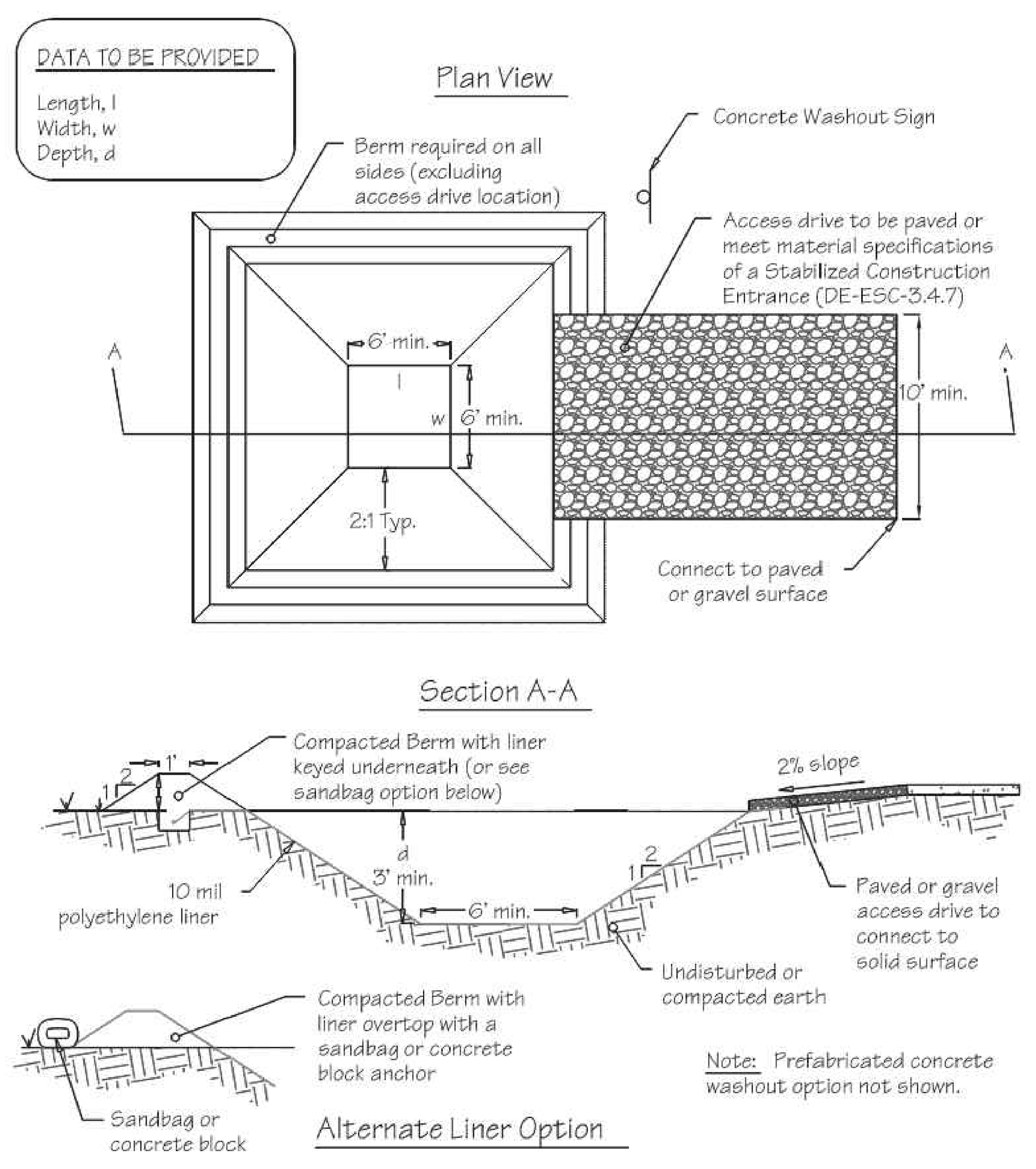
Standard Detail & Specifications
Concrete Washout



Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	CW	**DE-ESC-3.6.2** Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Concrete Washout

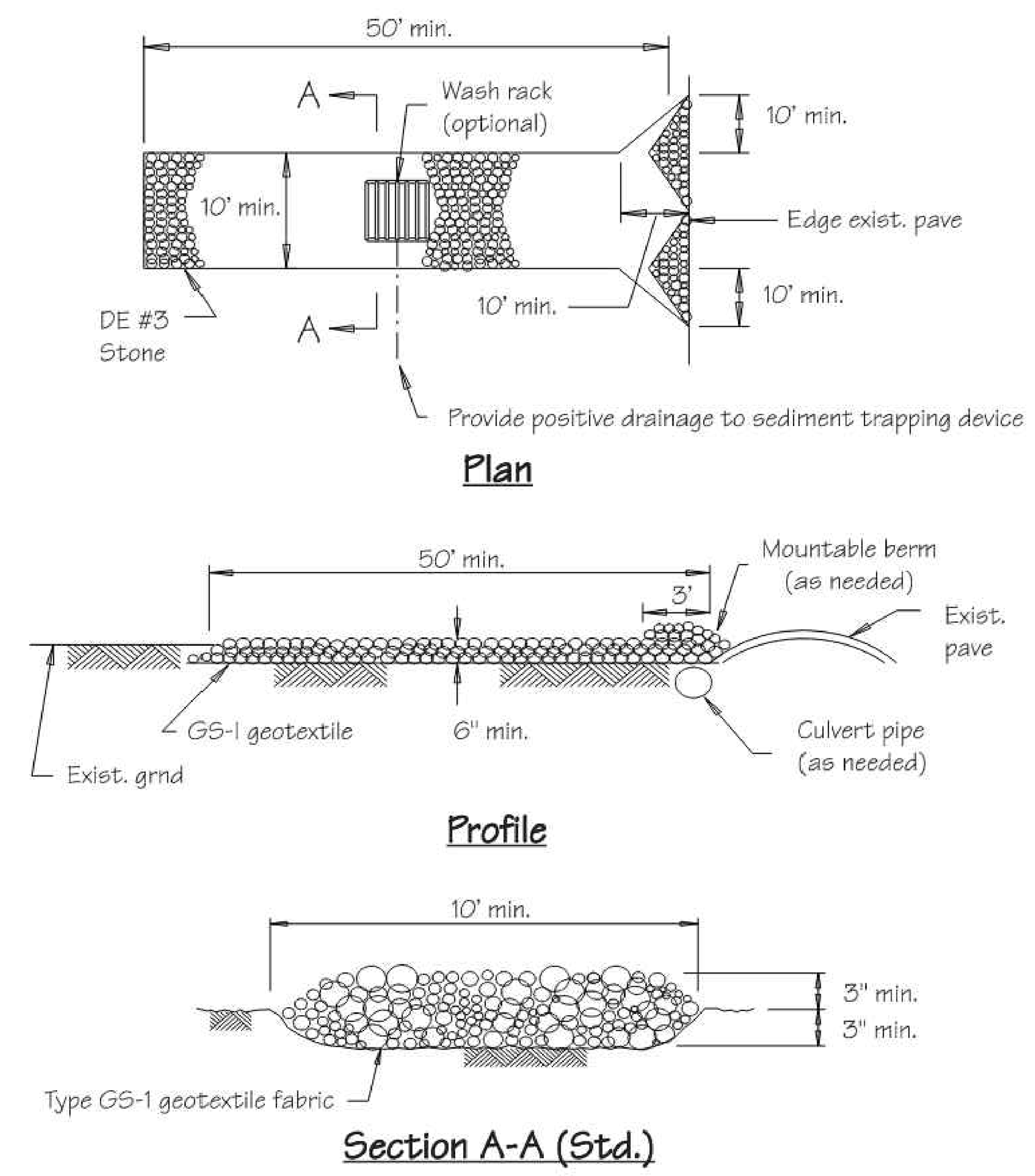
Construction Notes:

1. Locate washout area a minimum of 50 feet from open channels, stormdrain inlets, wetlands or waterbodies.
2. Locate washout area so that it is accessible to concrete equipment (service with a minimum 10 foot wide gravel accessway), but so it is not in a highly active construction area causing accidental damage.
3. Minimum dimensions for prefabricated units are 4 feet by 4 feet by 1 foot deep with a minimum 4mil polyethylene plastic liner. Minimum dimensions for constructed concrete washout areas are 6 feet by 6 feet by 3 feet deep, with a minimum 10mil polyethylene liner, 2:1 side slopes, and a 1 foot high by 1 foot wide compacted fill berm.
4. The liner must be free of tears or holes and placed over smooth surfaces to prevent puncturing. For excavated washouts, anchor the liner underneath the berm or overtop with sandbags or concrete blocks to hold in place.
5. Provide a sign designating the washout area, and for large construction sites, provide signs throughout directing traffic to its location.
6. Allow washed out concrete mixture to harden through evaporation of the wastewater. Once the facility has reached 75 percent of its capacity, remove the hardened concrete by reusing the broken aggregate onsite, recycling, or disposing of offsite. The hardened material can be buried on site with minimum of 1 foot of clean, compacted fill.
7. Apply a new liner before reusing the station for additional washouts after maintenance has occurred.

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	CW	**DE-ESC-3.6.2** Sheet 2 of 2

Effective February 2019

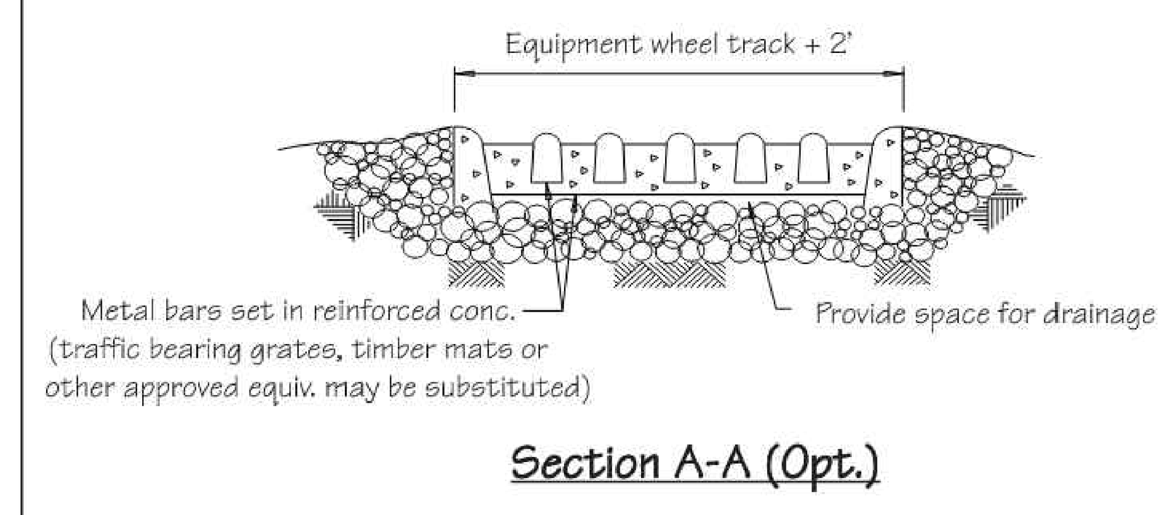
Standard Detail & Specifications
Stabilized Construct. Entrance



Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Stabilized Construct. Entrance



Construction Notes:

1. Stone size - Use DE #3 stone.
2. Length - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness - Not less than size (6) inches.
4. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Geotextile - Type GS-I; placed over the entire area prior to placing of stone.
6. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing - Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Inspection - Periodic inspection and needed maintenance shall be provided after each rain.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 2 of 2

Effective February 2019

PERMANENT SEEDING AND SEEDING DATES

Optimum Seeding Dates[2]: O = Optimum Planting Period; A = Acceptable Planting Period

Mix No.	Seeding Mixtures: Certified Seed[3]	Seeding Rate[1] lb/Ac	lb/1000 sq.ft.	Coastal Plain 2/1-4/30	Coastal Plain 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont 5/1-7/31	Piedmont 8/1-10/31	All[4] 10/31-2/1	Remarks
	Well Drained Soils										
1	Tall Fescue Weeping Lovegrass	140 10	3.2 0.23	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix. Tolerant of low fertility soils. Lovegrass very difficult to mow; Germinates only in hot weather
2	Deertongue Sheep Fescue Common Lespedeza[5] Inoculated	30 30 15	0.69 0.69 0.35	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix. Tolerant of low fertility soils. Good wildlife cover and food
3	Tall Fescue (Turf-type) **or** Strong Creeping Red Fescue **or** Perennial Ryegrass **plus** Flatpea[5]	50 50 50 15	1.15 1.15 1.15 0.34	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Good erosion control mix. Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatpea to suppress woody vegetation.
4	Strong Creeping Red Fescue Kentucky Bluegrass Perennial Ryegrass **or** Redtop **plus** White Clover[5]	100 70 15 5 3	2.3 1.61 0.35 0.11 0.07	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Suitable waterway mix. Canada Bluegrass more drought tolerant. Use Redtop for increased drought tolerance.
5	Switchgrass[6,7] **or** Coastal Panicgrass Big Bluestem Little Bluestem Indian Grass	10 10 5 5 5	0.23 0.23 0.11 0.11 0.1		O			O			Native warm-season mixture. Tolerant of low fertility soils. Drought tolerant. Poor shade tolerance. N fertilizer discouraged - weeds
6	Tall Fescue (turf-type) (Blend of 3 cultivars)	150	3.5	O	A	O	O	A	O		Managed filter strip for nutrient uptake.
7	Tall Fescue Ky. Bluegrass (Blend) Perennial Ryegrass	150 20 20	3.5 0.46 0.46	O	A	O	O	A	O		Three cultivars of Kentucky Bluegrass. Traffic tolerant.
8	Big Bluestem[7] Indian Grass[7] Little Bluestem[7] Creeping Red Fescue **plus one of:** Partridge Pea Bush Clover Wild Indigo Showy Tick-Trefoil	10 10 8 30 5 3 3 2	0.23 0.23 0.18 0.69 0.11 0.07 0.07 0.05	O	A		O	A			All species are native. Indian Grass and Bluestem have fluffy seeds. Plant with a specialized native seed drill. Creeping Red Fescue will provide erosion protection while the warm season grasses get established.

Figure 3.4.3.3a Seed mixes and recommended seeding dates

Effective February 2019

Mix No.	Seeding Mixtures: Certified Seed[3]	Seeding Rate[1] lb/Ac	lb/1000 sq.ft.	Coastal Plain 2/1-4/30	Coastal Plain 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont 5/1-7/31	Piedmont 8/1-10/31	All[4] 10/31-2/1	Remarks
	Poorly Drained Soils										
9	Redtop Creeping Bentgrass Sheep Fescue Rough Bluegrass	75 35 30 45	1.72 0.8 0.69 1	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Quick stabilization of disturbed sites and waterways
10	Reed Canarygrass[5]	10	0.23	A		O	A		O		Good erosion control, wildlife cover and wetland revegetation.
	Residential Lawns										
11	Tall Fescue Perennial Ryegrass Kentucky Bluegrass Blend	100 25 30	2.3 0.57 0.69	O	A	O	O	A	O		High value, high maintenance, light traffic, irrigation necessary. Well drained soils, full sun.
12	Tall Fescue Perennial Ryegrass Sheep Fescue	100 25 25	2.3 0.57 0.57	O	A	O	O	A	O		Moderate value, low maintenance, traffic tolerant
13	Creeping Red Fescue Chewings Fescue Rough Bluegrass Kentucky Bluegrass	50 50 20 20	1.15 1.15 0.4 0.4	O	A	O	O	A	O		Shade tolerant, moderate traffic tolerance, moderate maintenance.
14	Creeping Red Fescue Rough Bluegrass **or** Chewings Fescue	50 90	1.15 2.1	O	A	O	O	A	O		Shade tolerant, moisture tolerant.
15	K-31 Tall Fescue	150	3.5	O	A	O	O	A	O		Monoculture, but performs well alone in lawns. Discouraged.

1. When hydroseeding is the chosen method of application, the total rate of seed should be increased by 25%.
2. Winter seeding requires 3 tons per acre of straw mulch. Planting dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The maximum % of weed seeds shall be in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code.
4. Cool season species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
5. All leguminous seed must be inoculated.
6. Warm season grass mix and Reed Canary Grass cannot be mowed more than 4 times per year.
7. Warm season grasses require a soil temperature of at least 50 degrees in order to germinate, and will remain dormant until then.

Figure 3.4.3.3a Seed mixes and recommended seeding dates (cont.)

Effective February 2019

Permanent Stabilization Mixtures for Various Uses		
	Planting Mixtures by Soil Drainage Class	
Application	Well Drained Soils[1]	Poorly Drained Soils[1]
Residential/commercial lots	11,12,13,15	14,15
Residential open space	8	Contact plant specialist for site specific recommendations.
Pond and channel banks, dikes, berms and dams	2, 4	9,10,14
Drainage ditches, swales, detentions basins	3, 4, 13	9,14
Filter strips	2, 5, 6	6, 13
Grassed waterways, spillways	1,2,4	6, 9
Recreation areas, athletic fields	7,15	14,15
Steep slopes and banks, roadsides, borrow areas	1,2,3,4	4, 6
Sand and gravel pits, sanitary landfills	1,2,3,5	3, 4
Dredged material, spoilbanks, borrow areas	1,2	9,10
Streambanks and shorelines[2]	2, 3	2, 3
Utility rights-of-way	1,2,3,4	3,14

1. Refer to **Fig. 3.4.3.3a** for detailed information on seed mixes.
2. Refer to Chapters 16 and 18 of the NRCS Field Engineering Manual for additional measures.
NOTE: Refer to NRCS critical area planting standard for additional seed mixtures.

Figure 3.4.3.3b Seed mix selection chart

SPECIES	RECOMMENDED SEED VARIETIES
Tall Fescue	Alamo E, Apache II, Guardian, Rebel II, Shenandoah, Safari, Crossfire, Titan 2, Duke, Barrington, Comstock, Crossfire, Dominion, Heritage, Plantation, Rebel 2000, Titan 2
Kentucky Blue Grass	*Low Maintenance Varieties*: Barirus, Caliber, Eagleton, Freedom, Haga, Livingston, Merit, Midnight, Monopoly, Washington *Shade Tolerant Varieties*: Princeton, America, Brilliant, Champagne, Coventry, Unique, Liberator, Moonlight, Showcase, Nuglade, Compact
Perennial Rye Grass	Palmer III, Blazer II, Pennfine, Seville, Pinnacle, Pick MDR
Creeping Red Fescue	Cindy Lou, Jasper, Dawson, Pennlawn, Flyer, Ruby, Salem
Red Top	Streaker, Barracuda
Chewings Fescue	Longfellow, Jamestown, Discovery, Scaldis, Bighorn

NOTES:
1. The grass species listed in **Fig. 3.4.3.3a** are often available in many varieties. The seed choices listed above are the recommended varieties based on regional performance and availability.
2. The varieties listed above are examples of recommended varities. Contact University of Delaware, Cooperative Extension Service for additional information.

Figure 3.4.3.3c Recommended seed varieties

Effective February 2019

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES

Optimum Seeding Dates[1]: O = Optimum Planting Period; A = Acceptable Planting Period

Mix #	Species[6] Certified Seed	Seeding Rate lb/Ac[5]	lb/1000 sq.ft.	Coastal Plain 2/1-4/30	Coastal Plain [2] 5/1-8/14	Coastal Plain 8/15-10/31	Piedmont 3/1-4/30	Piedmont [2] 5/1-7/31	Piedmont 8/1-10/31	All 10/31-2/1	Planting Depth[3]
1	Barley	125	4	O	A	O	O	A	O		1-2 inches 2-3" sandy soils
2	Oats	125	4	O	A	A	O	A	A		1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	O		0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	O	A	O	O	A	O	A	0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7		O			O			0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5		O			O			0.5 inches 1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Applicable on slopes 3:1 or less.
4. Fifty pounds per acre of Annual Lespedeza may be added to 1/2 the seeding rate of any of the above species.
5. Use varieties currently recommended for Delaware. Contact a County Extension Office for information.
6. Warm season grasses such as Millet or Weeping Lovegrass may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

Figure 3.4.3.2a Temporary seeding guidelines

Effective February 2019

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ANDREW T. PROSSER
LICENSE
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

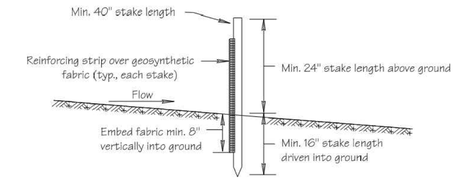
-

SEDIMENT AND STORMWATER MANAGEMENT PLANS
SUBJECT:
CONSTRUCTION SITE DETAILS AND NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

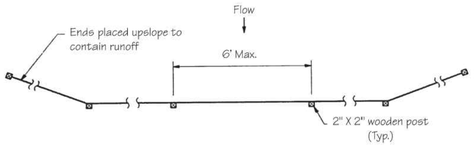
MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
C-05

Standard Detail & Specifications
Silt Fence



Section



DATA
Max. controlled slope

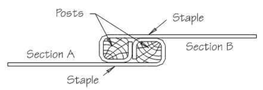
Plan

Source:	Symbol:	Detail No.
Adapted form MD Stds. & Specs. for ESC	SF	DE-ESC-3.1.2.1 Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Silt Fence

Construction Detail



Top

Method for joining continuous sections

Construction Notes:

1. Geosynthetic fabric to be fastened securely to fence posts with wire ties or staples.
2. When two sections of filter cloth adjoin each other they shall be overlapped by six inches and folded.
3. Maintenance shall be performed as needed and material removed when "bulges" develop in the silt fence.

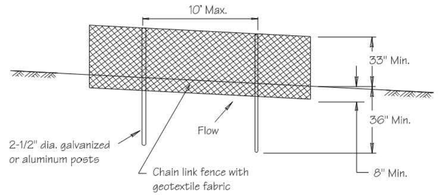
Materials:

1. Stakes: Steel (either T or U) or 2" x 2" hardwood
2. Geosynthetic Fabric: Type GD-I
3. Reinforcing strip: Wooden lath or plastic strip

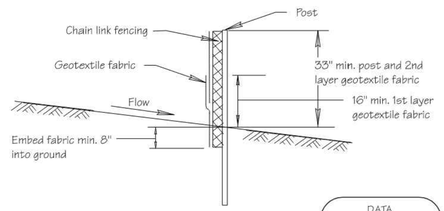
Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	SF	DE-ESC-3.1.2.1 Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications
Super Silt Fence



Perspective



DATA
Max. controlled slope

Section

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	SSF	DE-ESC-3.1.2.3 Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Super Silt Fence

Construction Notes:

1. The poles do not need to be set in concrete.
2. Chain link fence shall be fastened securely to the fence posts with wire ties or staples.
3. Geotextile fabric shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
4. Geotextile fabric shall be embedded a minimum of 8" into the ground.
5. When two sections of geotextile fabric adjoin each other, they shall be overlapped by 6" and folded.
6. Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence.

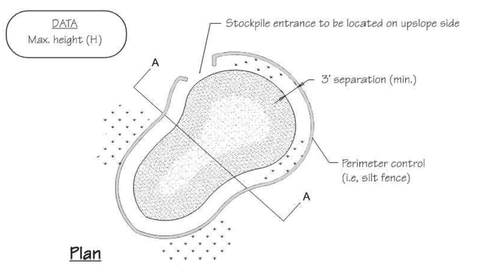
Materials:

1. Fencing: Fencing shall be 42 inches in height and constructed in accordance with the latest Delaware Department of Transportation (Del-DOT) Specifications for Chain Link Fencing (Section 727). The Del-DOT specification for a 6 foot fence shall be used, substituting 42 inch fabric and 6 foot length posts.
2. Geosynthetic Fabric: Type GD-I

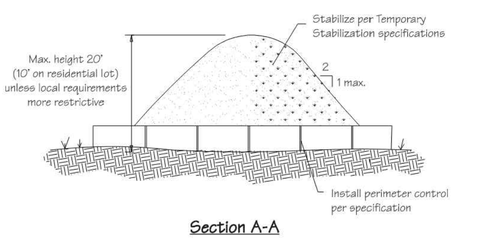
Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	SSF	DE-ESC-3.1.2.3 Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications
Soil Stockpile



Plan



Section A-A

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	SP	DE-ESC-3.7.3 Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Soil Stockpile

Construction Notes:

1. Locate stockpiles so that they are 50 feet from any storm drain inlet, open channel, wetland or waterbody. Redirect any concentrated flow around the stockpile using an approved erosion and sediment control measure.
2. Secure the perimeter of the stockpile with an approved erosion and sediment control perimeter device.
3. If stockpile is to remain inactive for more than 14 calendar days, the stockpile must be vegetated. Follow the temporary vegetation specifications. The vegetation chosen shall last the duration of the stockpile; the stockpile shall be restabilized if the temporary vegetation dies or erosion results.

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	SP	DE-ESC-3.7.3 Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications
Topsoiling

Construction Notes:

1. Site Preparation (Where Topsoil is to be added)

Note: When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, waterways and sediment basins.

a. Grading - Grades on the areas to be topsoiled which have been previously established shall be maintained.

b. Liming - Where the topsoil is either highly acid or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet). Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

c. Tilling - After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or by scarifying to a depth of a least 3 inches to permit bonding of the topsoil to the subsoil. Pack by passing a bulldozer up and down over the entire surface area of the slope to create horizontal erosion check slots to prevent topsoil from sliding down the slope.

2. Topsoil Material and Application

Note:Topsoil salvaged from the existing site may often be used but it should meet the same standards as set forth in these specifications. The depth of topsoil to be salvaged shall be no more than the depth described as a representative profile for that particular soil type as described in the soil survey published by USDA-SCS in cooperation with Delaware Agricultural Experimental Station.

Source:	Symbol:	Detail No.
USDA - NRCS		DE-ESC-3.4.1 Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Topsoiling

Construction Notes (cont.)

a. Materials - Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand or other soil as approved by an agronomist or soil scientist. It shall not have a mixture of contrasting textured subsoil and contain no more than 5 percent by volume of cinders, stones, slag, coarse fragment, gravel, sticks, roots, trash or other extraneous materials larger than 1-1/2 inches in diameter. Topsoil must be free of plants or plant parts of bermudagrass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistles, or others as specified. All topsoil shall be tested by a reputable laboratory for organic matter content, pH and soluble salts. A pH of 6.0 to 7.5 and an organic content of not less than 1.5 percent by weight is required. If pH value is less than 6.0 lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

Note: No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed to permit dissipation of toxic materials.

b. Grading - The topsoil shall be uniformly distributed and compacted to a minimum of four (4) inches. Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

Note:Topsoil substitutes or amendments as approved by a qualified agronomist or soil scientist, may be used in lieu of natural topsoil. Compost material used to improve the percentage of organic matter shall be provided by a certified supplier.

Compost amendments that are intended to meet specific post-construction stormwater management goals shall further meet the requirements of **Appendix 3.06.2 Post Construction Stormwater Management BMP Standards and Specifications, Section 14.0 Soil Amendments.**

Source:	Symbol:	Detail No.
USDA - NRCS		DE-ESC-3.4.1 Sheet 2 of 2

Effective February 2019

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PROFESSIONAL ENGINEER

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SEDIMENT AND STORMWATER MANAGEMENT PLANS

SUBJECT:
CONSTRUCTION SITE DETAILS AND NOTES

FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
C-06

ADDITIONAL STANDARD AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

Definition: The planting of quick growing vegetation to provide temporary stabilization on disturbed areas.

Purpose: To temporarily stabilize the soil, reduce damage from sediment and runoff to downstream or off-site areas, and to provide protection to disturbed areas until permanent vegetation or other erosion control measures can be established.

Conditions Where Practice Applies
Graded or cleared areas which are subject to erosion for a period of 14 days or more.

Specifications

1. Site Preparation
   a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.
   b. Final grading and shaping is not necessary for temporary seedings.
2. Seedbed Preparation

   It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.
3. Soil Amendments - Soil amendments are not typically required for temporary stabilization. However, in some cases soil conditions may be so poor that amendments are needed to establish even a temporary vegetative cover. Under these extreme conditions, the following guidelines should be used:
   a. Lime - Apply liming materials based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil. For additional information, see **Section 3.4.3.1, Additional Standards and Specifications for Soil Testing**.
   b. Fertilizer - Apply fertilizer based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils. For additional information, see **Section 3.4.3.1, Additional Standards and Specifications for Soil Testing**.

4. Seeding
   a. **Figure 3.4.3.2a** contains a list of recommended seed species for temporary stabilization and optimum seeding dates. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.
   b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.
   c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.
5. Mulching

   All mulching shall be done in accordance with **Section 3.4.5, Standard and Specifications for Mulching**.

ADDITIONAL STANDARD AND SPECIFICATIONS FOR PERMANENT STABILIZATION

Definition: The establishment of perennial vegetation to provide permanent stabilization on disturbed areas.

Purpose: To permanently stabilize soil on disturbed areas and to reduce sediment and runoff to downstream or off-site areas.

Conditions Where Practice Applies
Graded or cleared areas subject to erosion and where a permanent, long-lived vegetative cover is needed. In most cases, vegetation is the preferred method of stabilizing bare soil because of its numerous benefits. However, it cannot be expected to provide an erosion control cover and prevent soil slippage on a soil that is not stable due to its texture, structure, water movement or excessively steep slope.

Minimum Soil Conditions Needed for the Establishment and Maintenance of Permanent Vegetative Cover

1. Enough fine-grained materials to provide the capacity to hold at least a moderate amount of available moisture. A noticeable exception would be planting lovegrass and serecia lespedeza, which can be planted on a sandy soil.
2. Sufficient pore space to permit adequate root penetration.
3. The soil shall be free from any material harmful to plant growth.
4. If these conditions cannot be met, see **Section 3.4.1, Standard and Specifications for Topsoiling**.

Specifications

1. Site Preparation
   a. Prior to seeding, install needed erosion and sediment control practices such as asdiversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.
   b. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, anchoring and maintenance. All irregularities in the surface must be corrected in order to prevent the formation of depressions or water pockets.
2. Seedbed Preparation
   a. It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed shall be well pulverized, loose, uniform, and free of large clods, rocks, and other objectionable material.
   b. Flat areas and slopes up to 3:1 grade shall be loose and friable to a depth of at least 4 inches. The top layer of soil shall be loosened by raking, disking or other acceptable means before seeding.

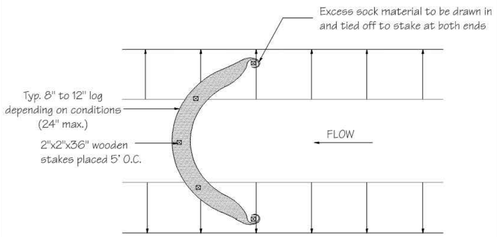
   c. Slopes steeper than 3:1 shall have the top 1-3 inches of soil loose and friable before seeding.
3. Soil Amendments
   a. Lime - Apply liming materials based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil. For additional information, see **Section 3.4.3.1, Additional Standards and Specifications for Soil Testing**.
   b. Fertilizer - Apply fertilizer based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils. For additional information, see **Section 3.4.3.1, Additional Standards and Specifications for Soil Testing**.
   c. Incorporation - On sloping land, the final disking and harrowing operation should be on the contour wherever feasible. On slopes steeper than 3:1, the lime and fertilizer shall be worked in the best way possible.
4. Seeding
   a. **Figure 3.4.3.3a** contains a list of recommended seed mixes for various soil conditions and optimum seeding dates. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.
   b. Every bag of seed is required by law to have an analysis tag attached to it. This tag contains essential information about the content and quality of the turf seed therein. All of the data on the tag relates in some way to the seed in the bag. Following is a list of items and information that they represent:
      - "Product" is the species or type of seed that was tested.
      - "Lot" refers to the specific lot of seed tested, providing a tracking of the varieties, production field and components in the bag.
      - "% Purity" is the number of seeds of a species/variety, expressed as percentages of the whole, found in the mix. "VNS" means "Variety Not Stated" indicating uncertainty about the quality and characteristics of the seed.
      - "% Germination" refers to the percentage of seed that germinated during testing.
      - "Other Crop Seeds" is the percentage of crop seeds of the tested sample that have been found during a physical separation of the sample.
      - "Inert Matter" is the percentage of dust, stems, soil, chaff, etc. of the total weight of the tested sample.
      - "Weed Seed" refers to the percentage of weed seeds in a sample.
      - "Noxious Weeds" are the weed seeds considered by local law to be noxious. This number must always be zero.
      - "Origin", "Net Weight" and "Date Tested" are self-explanatory.
   c. Apply seed uniformly with a broadcast seeder, drill, cultipacker or hydroseeder. All seed will be applied at the recommended rate and planting depth. Drill seeding is the preferred method, especially when light, fluffy seeds are in the mix. When hydroseeding is the chosen method, the total rate of seed should be increased by 25% over the rates recommended in **Figure 3.4.3.3a**. Seed mixtures loaded into boxes or containers, such as those found on drill seeders, should be agitated to prevent stratification in the box.

   Some seeders are also equipped with multiple boxes to separate the seed by species, resulting in even distribution.
   d. Seed that has been broadcast must be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.
5. Mulching

   All mulching shall be done in accordance with **Section 3.4.5, Standards and Specifications for Mulching**.
6. Irrigation
   a. Adequate moisture is essential for seed germination and plant growth. Daily irrigation can be critical in establishing permanent vegetation during dry or hot weather or on adverse site conditions.
   b. Irrigation must be carefully controlled to prevent runoff and subsequent erosion. Inadequate or excessive irrigation can do more harm than good.
7. Maintenance
   a. It takes one full year to establish permanent vegetation from the time of planting. Inspect seeded areas for failure and reestablish vegetation as soon as possible. Depending on site conditions, it may be necessary to irrigate, fertilize, overseed, or re-establish plantings in order to provide permanent vegetation for adequate erosion control.
   b. Maintenance fertilization rates should be established by soil test recommendations in accordance with an approved nutrient management plan. Spring seedings may require an application of fertilizer between September 1 and October 15, at least every two years. Fall seedings may require the same between March 15 and May 1 the following year. If slow release fertilizer is used, follow-up fertilizations may not be necessary for several years. Lime according to soil test recommendations at least once every five years. For additional information, see **Section 3.4.3.1, Additional Standards and Specifications for Soil Testing**.
8. Special Conditions

Under certain site conditions, alternative vegetative stabilization techniques are necessary. Examples include steeply sloped areas, extremely low fertility soils, acidic soils (pH less than 4.0) and dune stabilization. When any of these or other unusual site conditions are encountered, DNREC and/or the appropriate delegated agency may require products, seed species, mixtures and rates other than those listed in the following tables in order to achieve successful stabilization.

Standard Detail & Specifications
Compost Log Check Dam



Plan

DATA
Slope (S)
Spacing (X)
Log diameter (D)

Source:	Symbol:	Detail No.
Adapted from FILTREXX Technologies	CCD	**DE-ESC-3.3.6.2** Sheet 1 of 2

Standard Detail & Specifications
Compost Log Check Dam

Construction Notes:

1. Swales and channels shall be prepared in accordance with the construction specifications described in the **Standards and Specifications for Temporary Berm**, **Temporary Swale**, **Vegetated Channel**, or **Diversions**.
2. The check dam shall be constructed of compost filter log. The compost filter log shall be placed so that it extends across the full width of the channel.
3. The top of the check dam shall be constructed so that the center is approximately 6" lower than the outer edges, forming a weir that the water can flow across. The ends of the compost filter log shall wrap upslope to prevent end cutting.
4. The maximum height of the check dam at the center of the weir must not exceed two (2) feet.
5. Maximum spacing between dams should be the distance in the channel where the toe of the upstream dam is at the same elevation as the top of the downstream dam. (See **Standard & Specifications for Check Dams** for design chart.)

Source:	Symbol:	Detail No.
Adapted from FILTREXX Technologies	CCD	**DE-ESC-3.3.6.2** Sheet 2 of 2

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SEDIMENT AND STORMWATER MANAGEMENT PLANS
SUBJECT:
CONSTRUCTION SITE DETAILS AND NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
C-07

STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition: Placement of topsoil over a prepared subsoil prior to establishment of vegetation.

Purpose: To provide a suitable growth medium for final stabilization with vegetation.

Conditions Where Practice Applies:
This practice is recommended for sites with slopes 2:1 or flatter where:

1. The texture of the exposed subsoil or parent material is not suitable to produce adequate vegetative growth.
2. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
3. The original soil to be vegetated contains material toxic to plant growth.
4. The soil is so acid that treatment with limestone is not feasible.
5. High-quality turf and/or landscape plantings are to be established.

Planning Considerations:
Topsoil is the surface layer of the soil profile, generally characterized as being darker than the subsoil due to the presence of organic matter. It is the major zone of root development, carrying much of the nutrients available to plants, and supplying a large share of the water used by plants.

Although topsoil provides an excellent growth medium, there are disadvantages to its use. Stripping, stockpiling, and reapplying topsoil or importing topsoil, may not always be cost-effective. Topsoiling can delay seeding or sodding operations, increasing the exposure time of denuded areas. Most topsoil contains weed seeds, and weeds may compete with desirable species.

Advantages of topsoil include its high organic matter content and friable consistence, water-holding capacity, and nutrient content. Native topsoil that is low in organic matter may be improved through the addition of compost or similar amendments.

In site planning, the option of topsoiling should be compared with that of preparing a seedbed in subsoil. The clay content of subsoils does provide high moisture availability and deter leaching of nutrients and, when properly limed

and fertilized, subsoils may provide a good growth medium which is generally free of weed seeds. In many cases topsoiling may not be required for the establishment of less demanding, lower maintenance plant material. Topsoiling is strongly recommended where ornamental plants or high-maitenance turf will be grown. Topsoiling is a required procedure when establishing vegetation on shallow soils, soils containing potentially toxic materials, and soils of critically low pH (high acid) levels.

The following considerations should be given to any topsoiling operation:

1. Ensure an adequate volume of topsoil exists on the site. Topsoil should be compacted to a preferred depth of 4 inches. This will require additonal volume than if it were merely spread loosely.
2. If a soil test indicates the native topsoil does not contain the recommended percentage of organic matter, compost or other similar material may be used as an amendment. Compost shall be provided by a certified supplier. Compost amendments that are intended to meet specific post-construction stormwater management goals shall further meet the requirements of **Appendix 3.06.2 Post Construction Stormwater Management BMP Standards and Specifications, Section 14.0 Soil Amendments.**
3. Stockpiles should be located so as not to interfere with other site work.
4. Project scheduling must account for the time to spread, compact, treat, seed, and mulch the topsoiled area.
5. Care must be taken not to apply topsoil to a subsoil having major textural differences. Clayey topsoil over sandy subsoil is a particularly poor combination, as water may seep along the interface between the soil layers, causing the topsoil to slough. Sandy topsoil over a clay subsoil may aslo be prone to failure.
6. If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly, making it difficult to establish vegetation. In order to improve this bonding, the subsoil should be scarified prior to spreading of the topsoil.
7. Topsoiling of steep slopes should generally be avoided unless adequate measures have been taken to prevent slope failure. (See **Section 3.4.2, Standard & Specification for Slope Treatment**.)

ADDITIONAL STANDARD AND SPECIFICATIONS FOR SOIL TESTING

Definition: Soil is tested to determine the fertility status so that the required amount of lime and fertilizer is applied for optimal plant growth.

Purpose: Soil testing will serve the following purposes:
1. To apply the appropriate amount of lime or fertilizer for optimal plant growth.
2. To provide suitable growth medium for final stabilization with vegetation.

Conditions Where Practice Applies:
Soil testing is recommended for all sites that will be stabilized with vegetation where:
1. Existing soil conditions are not suitable to produce adequate vegetation growth.
2. The soil to be vegetated contains material toxic to plant growth.
3. High-quality turf and/or landscape plantings are to be established.
4. Significant amounts of topsoil have been removed from the site through excavation or grading.
5. Large areas are to be planted with the same type of vegetation (to minimize entire areas with unsuccessful germination or plant survival due to poor soil conditions).

Planning Considerations:
During site construction the top layer of the soil, the topsoil, is altered through grading, compaction, and excavation. The topsoil is an important layer in the soil where plants establish their roots and extract the necessary nutrients for growth and survival. When the topsoil is stripped from the site, establishing vegetation can prove to be unsuccessful, timely, and overall costly. Soil tests provide the following information, pH, buffer pH, lime requirement, P, K, Ca, Mg, Mn, Cu, Zn, and organic matter by LOI. Additional information can be requested. Soil tests provide the fertility of the soil and whether lime or additional fertilizer may be required for successful plant growth. This information is beneficial both economically and enviironmentally. Determining the fertility of the soil will provide the precise amount of nutrients needed to establish lawns or other plantings.

Obtaining the Soil Sample:
An accurate soil test can only be achieved through obtaining a good soil sample. A soil sample weighing approximately ½ pound is used to represent thousands of pounds of soil on the subject parcel of land. The sample should reflect the site conditions that are to be stabilized with vegetation. Soil testing materials including a sampling tube, auger or spade; soil sample bags; sample information sheets; and sampling instructions available at your County Cooperative Extension office. The soil samples must be placed in the designated cloth bags that are provided at the Extension office. The soil sample along with a small fee is then forwarded to the University of Delaware where the testing occurs.

1. The soil sample should consist of 15 to 25 cores taken from the sampling area.
2. Areas where soil and vegetation conditions appear different should be sampled separately. Locate sample locations on a map or sketch.
3. The maximum sample area for one soil test is 40 acres.
4. Each core should be taken to a depth of 6 to 9 inches. Remove any leaf litter or debris before sampling.
5. Place cores in a **clean** plastic pail and mix them together thoroughly.
6. Spread the mixture out on **clean** paper to dry.
7. Fill the sample bag to the level indicated and discard the rest of the material.

Do Not Contaminate the Sample
1. Use clean tools to obtain the sample.
2. Chemicals, fertilizer, or lime on tools or hands can contaminate a soil sample.
3. Steel sampling tools and plastic buckets are recommended for obtaining the sample.

Do not take samples in areas that are significantly different.
1. Stay away from lanes or border areas.
2. Anomalies such as potholes, sandy ridges and eroded areas should be avoided.

Forwarding the Sample
1. Name each sample and keep a complete record of the area represented.
2. Completely fill out the information sheet provided with each sample bag and place in the attached envelope.
3. Do not use sample bags other than those provided by the laboratory.
4. Your recommendations will be no better than the information submitted.

How often should soil be tested?
1. Once adequate fertility levels are established, lawns need only be sampled every 2 to 3 years.
2. Vegetable gardens should be sampled every 1 to 2 years.
3. Where liming is likely, sample well in advance of planting. Because lime reacts slowly, it should be mixed with soil several months before planting.

Additional Information
Contact the local Cooperative Extension Office for methods of applying lime and fertilizers.

New Castle County: 910 South Chapel Street, Newark, DE 19716-1303 (302)-831-2506.
Kent County: 2319 South DuPont Highway, Dover, DE 19901, (302) 697-4000.
Sussex County: University of Delaware, Research and Education Center, R.D. 6, Box 48, Georgetown, DE 19947, (302) 856-7303.

NOTE: Effective January 1, 2004, all persons who control the application of nutrients to 10 acres or greater shall develop and implement a Nutrient Management Plan and become certified by the program. A Nutrient Management Plan is a strategy to manage the amount, placement, timing and application of nutrients. The Plan shall be updated every three years, with annual reports submitted by March 1 of the calendar year.

STANDARD AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

Definition: The preservation and/or establishment of vegetation to prevent the erosion of disturbed areas.

Purpose:

Preserving or establishing a cover of healthy vegetation is the most effective and economical means for preventing soil erosion. The vegetation shields the soil surface from the impact of falling raindrops, slows runoff, holds soil particles in place, improves and maintains the infiltrative capacity of the soil, and removes subsurface water through evapotranspiration. For example, a grass cover placed on bare ground will reduce runoff from a one (1) year frequency storm event (2.8 inches of rainfall) by 50-100 percent, depending on the soil type (Calculation based on Soil Conservation Service Technical Release No. 55).

Because vegetation is so effective in reducing runoff, it can minimize the erosion potential of a construction site and reduce the need for structural practices. It is important, therefore, to preserve as much of the existing vegetation as possible by limiting grading. On large sites, grade and stabilize in stages, so that one area is re-vegetated before another is cleared. If graded areas are to remain idle for extended periods of time, the establishment of a temporary vegetative cover will reduce the runoff and erosion potential. This may significantly reduce the amount of maintenance required for structural controls at the construction site. The cost savings from reduced maintenance may be much greater than the cost of temporary seeding.

The success of vegetative establishment depends on proper application, installation and care. The steps for proper stabilization are:

- Site preparation;
- Soil ammendments;
- Seed application and
- Mulching and mulch anchoring.

Details for each of these steps must be included on all sediment and stormwater plans.

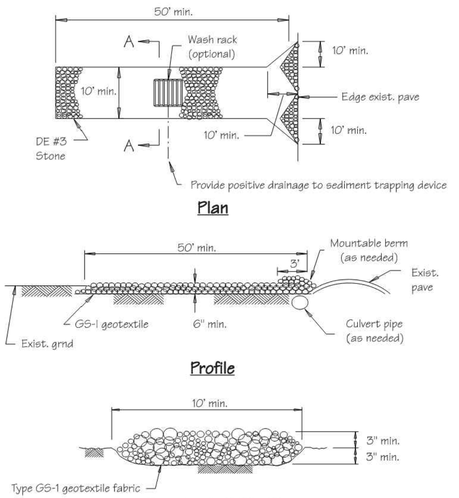
Stands of vegetation also need to be maintained to assure their continuing vigor and function. It is less costly to carry on a maintenance program than it is to make repairs after an extended period of neglect. Maintenance typically includes mowing, fertilizer and lime application, weed management, pest and disease control, tree pruning and removal of invasive or undesirable plants.

Planting vegetation such as trees, shrubs, vines and ground covers on disturbed areas offers an alternative to grasses and provides additional functions such as wildlife food and cover, windbreaks and aesthetic enhancements. These plants are usually reserved for special purpose, high value landscaping. This practice cannot be expected to provide an erosion control cover and prevent soil slippage on a soil that is not stable due to its texture, structure, slope or water movement. For unusual or site specific applications, it would be best to engage a landscape architect or consulting forester. Additional information may be obtained through the local office of the Delaware Cooperative Extension System, the Delaware Forest Service, the local field office of the Natural Resources Conservation Service, or the local Conservation District.

In summary, preserving the existing vegetation or establishing a new temporary or permanent vegetative cover as soon as possible after grading reduces runoff and erosion. Maintaining vegetation will ensure that these benefits will continue for the long term. This provides better environmental protection and may reduce construction costs by limiting the number of structural practices required and associated maintenance costs.

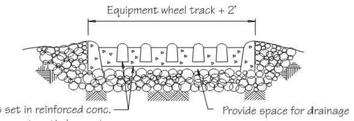
The following sections contain additional standards and specifications for both temporary and permanent vegetative stabilization, including sodding. There are also several tables and charts to assist the designer in selecting the appropriate plant material for a given set of conditions.

Standard Detail & Specifications
Stabilized Construct. Entrance



Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 1 of 2

Standard Detail & Specifications
Stabilized Construct. Entrance



Section A-A (Opt.)

Construction Notes:

1. Stone size - Use DE #3 stone.
2. Length - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness - Not less than size (6) inches.
4. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Geotextile - Type GS-I; placed over the entire area prior to placing of stone.
6. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing - Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Inspection - Periodic inspection and needed maintenance shall be provided after each rain.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 2 of 2

REVISIONS PER:	DATE:	BY:
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elagroup.com

ANDREW T. PROSSER LICENSED DELAWARE PROFESSIONAL ENGINEER No. 18486

-

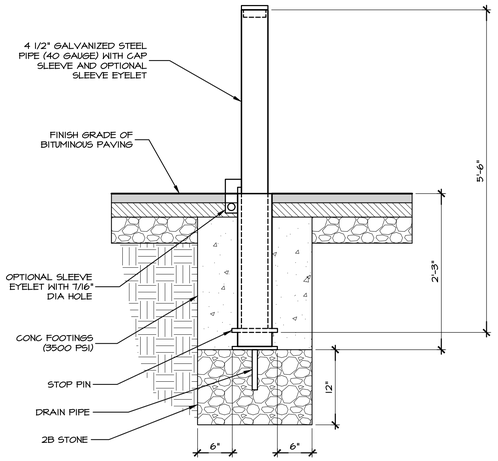
SEDIMENT AND STORMWATER MANAGEMENT PLANS
SUBJECT:
CONSTRUCTION SITE DETAILS AND NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

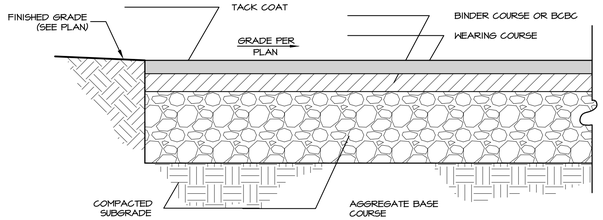
DRAWING NO.
C-08

NOTES:

1. BOLLARD (NO. 1100-04) AND SLEEVE (NO. 8304-XXB) MANUFACTURED BY PIN ATHLETIC COMPANY OR APPROVED EQUAL. DISTRIBUTED BY GEORGE ELY ASSOCIATES, INC. (800) 262-8448.
2. BOLLARD AND SLEEVE TO BE SUPPLIED BY MANUFACTURER WITH PRIME COAT ONLY. CONTRACTOR TO APPLY TWO FINISH COATS OF PAINT AS APPROVED BY DNREC TO EXPOSED PORTION OF BOLLARD.



A REMOVABLE STEEL BOLLARD DETAIL
NO SCALE



NOTE: USE PG 64-22 IN PLACE OF AC-20 WHEN DESIGNATING SUPERPAVE ASPHALT

1. RECLAIMED AGGREGATE MATERIAL SHALL MEET THE REQUIREMENTS OF DELDOT STANDARDS.
2. IT IS RECOMMENDED THAT THE PAVEMENT SECTION AND OTHER DESIGN CONSIDERATIONS SUCH AS PAVEMENT BASE DRAIN BE DESIGNED BY A GEOTECHNICAL PROFESSIONAL BASED UPON FIELD TESTING OF SOIL SUBGRADE CONDITIONS ANTICIPATED PAVEMENT LOADING, INCLUDING CONSTRUCTION TRAFFIC, AND OTHER APPROPRIATE DESIGN FACTORS. THE PAVEMENT SECTION SPECIFIED ON THIS DETAIL IS PROVIDED WITHOUT A GEOTECHNICAL PROFESSIONAL AND REPRESENTS A STANDARD PAVEMENT SECTION THAT DOES NOT CONSIDER THESE FACTORS.'
3. THE SUITABILITY OF THE PAVEMENT SUBGRADE SHALL BE INSPECTED AND APPROVED BY GEOTECHNICAL PROFESSIONAL PRIOR TO INSTALLATION OF PAVING SECTION. IF SUBGRADE IS DETERMINED UNSUITABLE BASED UPON COMPACTION, SOIL TYPE, ETC., APPROPRIATE STABILIZATION MEASURES AS RECOMMENDED BY THE GEOTECHNICAL PROFESSIONAL SHALL BE IMPLEMENTED.
4. IF ANY PRECIPITATION OCCURS BEFORE STONE SUBBASE INSTALLATION, PAVEMENT SUBGRADE SHALL MUST BE RE-INSPECTED AND APPROVED TO CONFIRM SUITABILITY.
5. SPECIFIC PAVING CRITERIA AS IT RELATES TO APPROVED AMBIENT TEMPERATURE FOR PAVING INSTALLATION SHALL BE FOLLOWED.

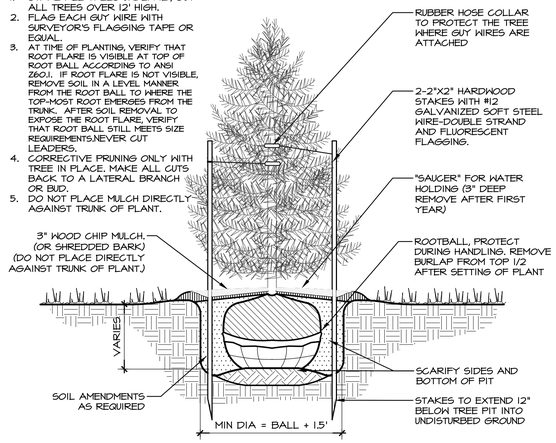
BITUMINOUS PAVING SCHEDULE

SYM	WEARING COURSE		BINDER COURSE		AGGREGATE BASE COURSE		LOCATION
	TYPE	COMPACTED THICKNESS	TYPE	COMPACTED THICKNESS	TYPE	COMPACTED THICKNESS	
A	SUPERPAVE ASPHALT DESIGN, HMA WEARING COURSE, PG 64-22, 0.0 TO 0.3 MILLION ESAL'S, 9.5 MM, SRL-L	1.5"	SUPERPAVE ASPHALT DESIGN, HMA BINDER COURSE, PG 64-22, 0.0 TO 0.3 MILLION ESAL'S, 25 MM MIX, 50 GYRATIONS	3.5"	2A MODIFIED	8"	DRIVEWAY/PARKING AREA

B BITUMINOUS PAVEMENT SECTION / SCHEDULE
NO SCALE

NOTES:

1. STAKE ALL TREES UNDER 12', GUY ALL TREES OVER 12' HIGH.
2. FLAG EACH GUY WIRE WITH SURVEYOR'S FLAGGING TAPE OR EQUAL.
3. AT TIME OF PLANTING, VERIFY THAT ROOT FLARE IS VISIBLE AT TOP OF ROOT BALL ACCORDING TO ANSI Z60.1. IF ROOT FLARE IS NOT VISIBLE, REMOVE SOIL IN A LEVEL MANNER FROM THE ROOT BALL TO WHERE THE TOP-MOST ROOT EMERGES FROM THE TRUNK. AFTER SOIL REMOVAL TO EXPOSE THE ROOT FLARE, VERIFY THAT ROOT BALL STILL MEETS SIZE REQUIREMENTS.NEVER CUT LEADERS.
4. CORRECTIVE PRUNING ONLY WITH TREE IN PLACE. MAKE ALL CUTS BACK TO A LATERAL BRANCH OR BUD.
5. DO NOT PLACE MULCH DIRECTLY AGAINST TRUNK OF PLANT.



C EVERGREEN TREE PLANTING DETAIL
NO SCALE

CONSTRUCTION SEQUENCE:

CONSTRUCTION IS EXPECTED TO BEGIN SUMMER 2021, AFTER ALL COUNTY AND STATE APPROVALS HAVE BEEN RECEIVED. CONSTRUCTION WILL PROCEED IN A TIMELY MANNER IN ORDER TO LIMIT THE POTENTIAL FOR ACCELERATED EROSION AND SEDIMENTATION. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE CONSTRUCTION SEQUENCE PRIOR TO BREAKING GROUND TO MINIMIZE THE POTENTIAL FOR ANY SCHEDULING CONFLICTS. THE SEQUENCE OF EARTH MOVING ACTIVITIES SHALL BE APPROXIMATED AS FOLLOWS:

GENERAL CONSTRUCTION STAGING:

1. NOTIFY THE DNREC SEDIMENT AND STORMWATER PROGRAM IN WRITING AT LEAST FIVE (5) DAYS PRIOR TO THE START OF CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.
2. PRIOR TO ANY CLEARING, INSTALLATION OF SEDIMENT CONTROL MEASURES OR GRADING, A PRE CONSTRUCTION MEETING SHALL BE SCHEDULED AND CONDUCTED WITH THE AGENCY CONSTRUCTION SITE REVIEWER. THE LANDOWNER/DEVELOPER, CONTRACTOR, AND A THIRD PARTY CERTIFIED CONSTRUCTION REVIEWER(CCR) ARE REQUIRED TO BE IN ATTENDANCE AT THE PRE-CONSTRUCTION MEETING; THE DESIGNER IS RECOMMENDED TO ATTEND.
3. EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING STAGING OF EARTHMOVING ACTIVITIES. EACH STAGE SHALL BE COMPLETED BEFORE A SUBSEQUENT STAGE IS INITIATED. AT LEAST 2 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY MISS UTILITY OF DELMARVA AT 1-800-282-8555 TO LOCATE BURIED UTILITIES.
4. THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST REVISED.
5. INDIVIDUAL RESPONSIBLE FOR EARTH DISTURBANCE ACTIVITIES MUST ENSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIALS. CONSTRUCTION WASTES INCLUDE BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, BUILDING MATERIALS, CONCRETE WASH WATER, AND SANITARY WASTES, ETC. THAT COULD ADVERSELY IMPACT WATER QUALITY. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHEREVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED TO DISPOSAL.
6. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE CONTROL METHOD TO ELIMINATE THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION.
7. UPON COMPLETION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY, DISTURBED AREAS OF THE SITE SHALL BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION. EROSION AND SEDIMENT CONTROL BMP'S SHALL BE IMPLEMENTED AND MAINTAINED UNTIL PERMANENT STABILIZATION IS ACHIEVED. IN ORDER FOR AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE/PHASE OF AN ACTIVITY TO BE CONSIDERED PERMANENTLY STABILIZED, THE DISTURBED AREAS SHALL BE COVERED WITH ONE OF THE FOLLOWING: (1) A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER, WITH A DENSITY CAPABLE OF RESISTING ACCELERATED EROSION AND SEDIMENTATION. (2) AN ACCEPTABLE BMP, WHICH PERMANENTLY MINIMIZES ACCELERATED EROSION AND SEDIMENTATION.
8. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHOULD BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENTATION ON THE SITE. ACCUMULATED SEDIMENT SHOULD BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR REPAIR MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.
9. STABILIZATION MEASURES TO BE INITIATED IF DUST CONTROL BECOMES A PROBLEM.

SITE SPECIFIC SEQUENCE:

1. ROUGH GRADE APPROXIMATELY 50' AT THE PROPOSED STABILIZED CONSTRUCTION ENTRANCE AND INSTALL THE STABILIZED CONSTRUCTION ENTRANCE AS INDICATED ON THE PLAN. THE CONSTRUCTION ENTRANCE SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS PROVIDED ON THE PLANS.
2. DELINEATE THE CONSTRUCTION STAGING AREA FOR CONTRACTORS.
3. THE CONSTRUCTION STAGING AREA MUST BE IMMEDIATELY STABILIZED AND MAINTAINED IN ORDER TO PREVENT ANY SEDIMENT LADEN RUNOFF. STONE OR OTHER SUITABLE STABILIZATION FOR THE STAGING AREA SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES. SEDIMENT LADEN RUNOFF IS NOT PERMITTED FROM THE CONSTRUCTION STAGING AREAS.
4. INSTALL ALL PERIMETER SILT FENCE AS SHOWN ON THE CONSTRUCTION SITE PLAN. CONTRACTOR IS TO ADJUST SILT FENCE AS NECESSARY DURING GRADING ACTIVITIES. CLEAR AND GRUB ONLY THE AREAS NECESSARY TO INSTALL AND REMOVE SILT FENCE AS SHOWN ON THE PLAN AND IN ACCORDANCE WITH THE DETAILS PROVIDED. SILT FENCE SHALL BE INSTALLED PARALLEL TO THE CONTOURS OR CONSTRUCTED AT LEVEL ALIGNMENTS. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH ONE-HALF OF THE HEIGHT OF THE EXPOSED SILT FENCE OR AS DIRECTED BY THE ENGINEER. ANY SECTION THAT BECOMES COMPROMISED MUST IMMEDIATELY BE REPLACED OR REPAIRED. NOTE: ALL PERIMETER CONTROLS ARE TO BE REVIEWED BY THE AGENCY CONSTRUCTION SITE REVIEWER AND APPROVED PRIOR TO PROCEEDING WITH FURTHER SITE DISTURBANCE OR CONSTRUCTION.
5. INSTALL COMPOST LOG CHECK DAMS AS NEEDED IMMEDIATELY AFTER SWALE INSTALLATION.
6. PUMPING/DEWATERING IS LIKELY TO BE REQUIRED DURING CONSTRUCTION. IT SHALL BE DONE IN ACCORDANCE WITH THE DELWARE EROSION AND SEDIMENT CONTROL HANDBOOK AND APPROVED BY THE APPROPRIATE AGENCY.
7. REMOVE TOPSOIL AND STOCKPILE AS NEEDED. STOCKPILE SHALL BE IN ACCORDANCE WITH THE DETAILS SHOWN ON PLANS. THE STOCKPILE SHALL BE SEEDED WITH A TEMPORARY SEED MIXTURE AND MULCHED.
8. ROUGH GRADE THE SITE AND BEGIN CONSTRUCTION, AS NECESSARY.
9. INSTALL PUMP STATION, DRIVEWAY, PARKING AND OTHER IMPROVEMENTS. DURING BUILDING CONSTRUCTION, WATER SHALL BE NATURALLY DIRECTED OR PUMPED AROUND THE BUILDING TO REACH SILT FENCE.
10. ANY DISTURBANCE CREATED DURING THE PREVIOUS STEPS, INCLUDING RE-GRADING NECESSARY TO ACHIEVE THE FINISHED GRADES AS DEPICTED ON THE APPROVED GRADING/DRAINAGE PLANS SHALL BE STABILIZED IMMEDIATELY THROUGH SEEDING AND MULCHING.
11. SPREAD TOPSOIL (6" MINIMUM) OVER ALL AREAS WHICH HAVE NOT BEEN PAVED (OR WILL NOT BE PAVED) AND ALL AREAS WHICH WERE NOT SEEDED DURING PREVIOUS CONSTRUCTION STAGES COMPLETED EARLIER DURING THE PROJECT. FINAL PASSES DURING FINE GRADING SHALL BE MADE AT RIGHT ANGLES TO THE SLOPES. SEED ALL AREAS WITH A PERMANENT SEED MIX AS SPECIFIED AND PROVIDE MULCH OVER ALL FRESHLY SEEDED AREAS. ALL SEEDED AREAS MUST BE MULCHED WITHIN 48 HOURS AFTER SEEDING HAS BEEN COMPLETED.
12. INSTALL LANDSCAPE PLANTINGS PER THE POST CONSTRUCTION SITE STORMWATER MANAGEMENT PLAN.
13. AS APPROVED IN WRITING, BY THE CONSTRUCTION SITE REVIEWER, ONCE CONSTRUCTION IS DEEMED COMPLETE CONTRACTOR IS TO REMOVE CONSTRUCTION STAGING AREA AND EQUIPMENT AND CLEAN THE STAGING AREA TO ENSURE SEDIMENT LADEN WILL NOT LEAVE THE SITE. THE REMAINING TEMPORARY SITE EROSION CONTROLS (SUCH AS SILT FENCE, COMPOST LOG CHECK DAMS, ETC.) SHALL BE REMOVED. ANY DISTURBANCE CREATED DURING THIS PROCEDURE SHALL BE STABILIZED IMMEDIATELY THROUGH SEEDING AND MULCHING.

D CONSTRUCTION SITE NOTES & CONSTRUCTION SEQUENCE
NO SCALE

REVISIONS PER:	DATE:	BY:
1. -	-	-
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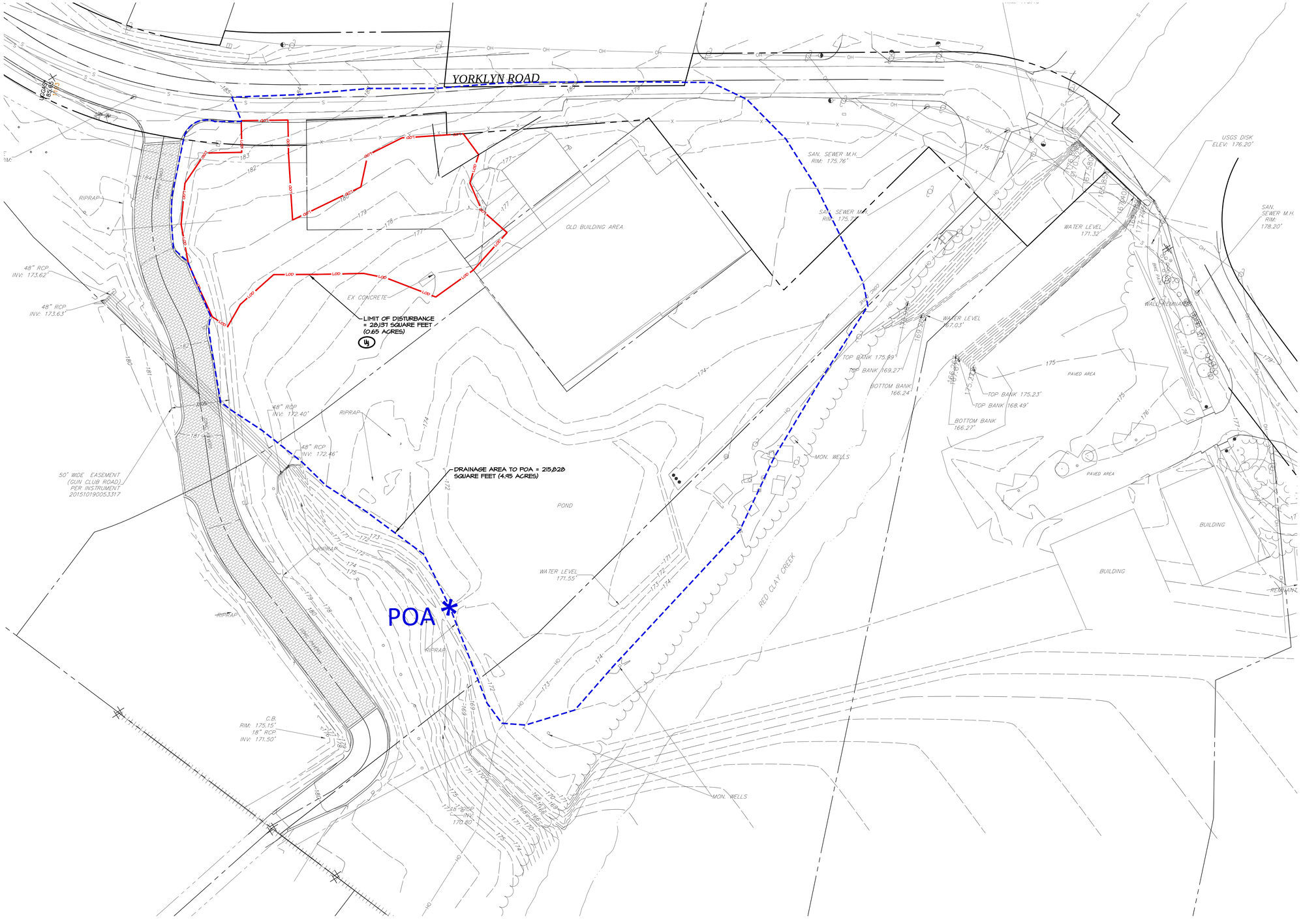
ANDREW T. PROSSER
LICENSED
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS
SUBJECT:
CONSTRUCTION SITE DETAILS AND NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
C-09



GRADING LEGEND

- 355 — PROPOSED CONTOUR
- 355 — EXISTING CONTOUR
- EXISTING STORM DRAINAGE PIPING (Headwall, Manhole, Inlet, Endwall, Rip Rap)
- PROPOSED STORM DRAINAGE PIPING (HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP)
- OH — Utility Pole — Electric Meter — EXISTING OVERHEAD ELECTRIC
- UE — Utility Pole — Electric Transformer — EXISTING UNDERGROUND ELECTRIC
- UT — Utility Pole — Manhole — Telephone Box — EXISTING UNDERGROUND TELEPHONE
- GV — Gas Valve — G — GM Gas Meter — EXISTING GAS LINE
- C.O. — Clean Out — S — Manhole — EXISTING SANITARY SEWER LINE
- FM — Manhole — EXISTING SANITARY FORCE MAIN
- WM — Water Meter — W — Water Valve — WV — Fire Hydrant — EXISTING WATER LINE
- × 354.05 — EXISTING SPOT GRADE
- + 352.50 — PROPOSED SPOT GRADE
- 5% — SLOPE GRADIENT AND DIRECTION
- LOD — LIMIT OF DISTURBANCE
- OVERALL WATERSHED AREA
- POA * — POINT OF ANALYSIS

NORTH

SCALE IN FEET: 1" = 40'

0 20 40 80 120

REVISIONS PER:	DATE:	BY:
1. -	-	-
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4. -	-	-
5. -	-	-

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ANDREW T. PROBERT LICENSED DELAWARE PROFESSIONAL ENGINEER No. 18486

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

SUBJECT:
PRE CONSTRUCTION DRAINAGE PLAN

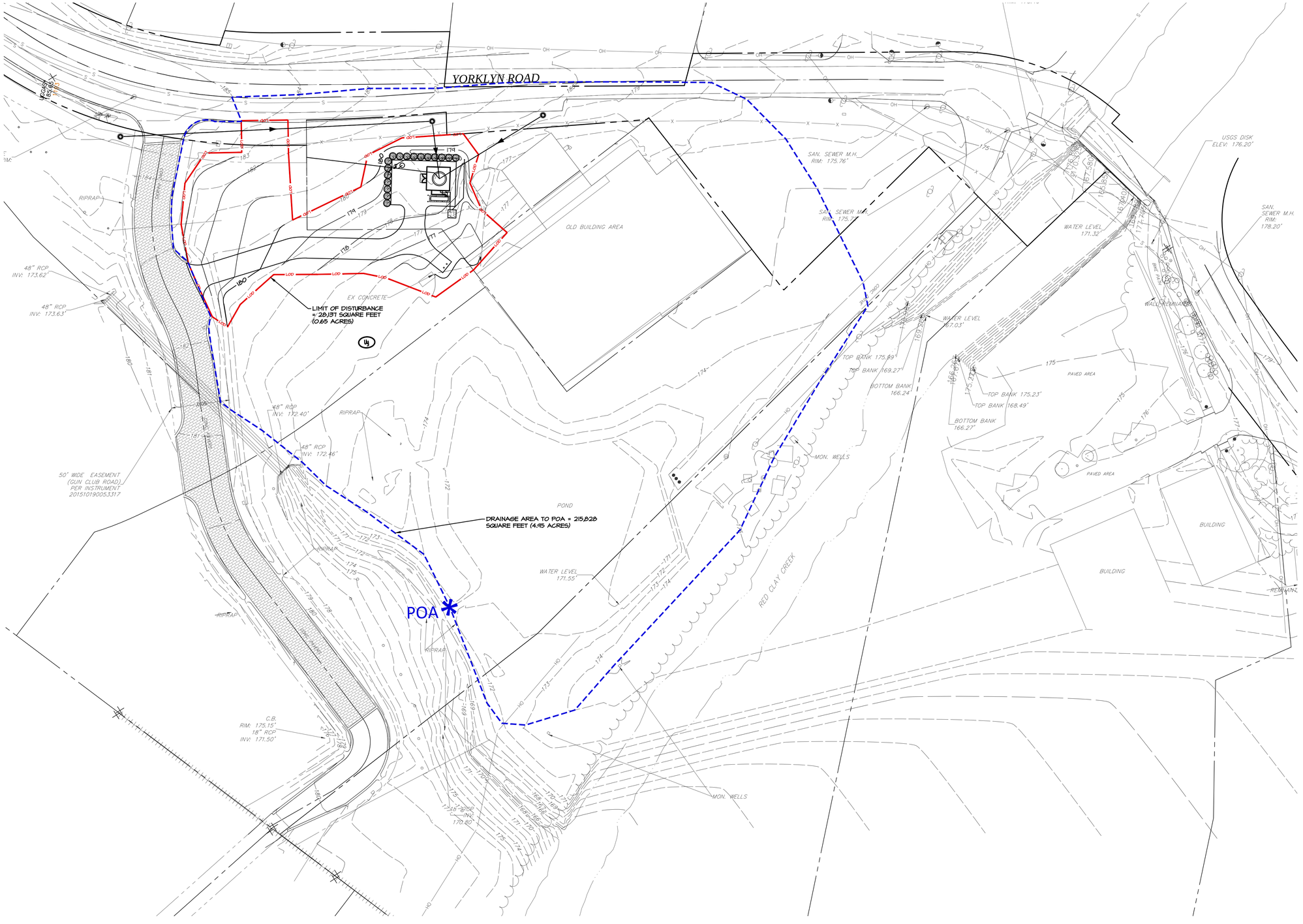
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1" = 40'

DRAWING NO.
C-10

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sediment and Stormwater\Pre Construction Drainage Plan.dwg - PLOTTED: Apr 23, 2021 10:04 am



GRADING LEGEND

- 355 — PROPOSED CONTOUR
- 355 — EXISTING CONTOUR
- EXISTING STORM DRAINAGE PIPING (Headwall, Manhole, Inlet, Endwall, Rip Rap)
- PROPOSED STORM DRAINAGE PIPING (HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP)
- EXISTING OVERHEAD ELECTRIC (Utility Pole, OH, Electric Meter)
- EXISTING UNDERGROUND ELECTRIC (Utility Pole, UE, Electric Transformer)
- EXISTING UNDERGROUND TELEPHONE (Utility Pole, UT, Manhole, Telephone Box)
- EXISTING GAS LINE (Gas Valve, G, Gas Meter)
- EXISTING SANITARY SEWER LINE (Clean Out, S, Manhole)
- EXISTING SANITARY FORCE MAIN (FM, Manhole)
- EXISTING WATER LINE (Water Meter, W, Water Valve, WV, Fire Hydrant)
- x 354.05 EXISTING SPOT GRADE
- + 352.50 PROPOSED SPOT GRADE
- 5% SLOPE GRADIENT AND DIRECTION
- LOD LOD LIMIT OF DISTURBANCE
- OVERALL WATERSHED AREA
- POA * POINT OF ANALYSIS

NORTH

SCALE IN FEET: 1" = 40'

0 20 40 80 120

REVISIONS PER:	DATE:	BY:
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3. -	-	-
4. -	-	-
5. -	-	-

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ANDREW T. PROCTER
LICENSED
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

-

SEDIMENT AND STORMWATER MANAGEMENT PLANS

SUBJECT:
POST CONSTRUCTION DRAINAGE PLAN

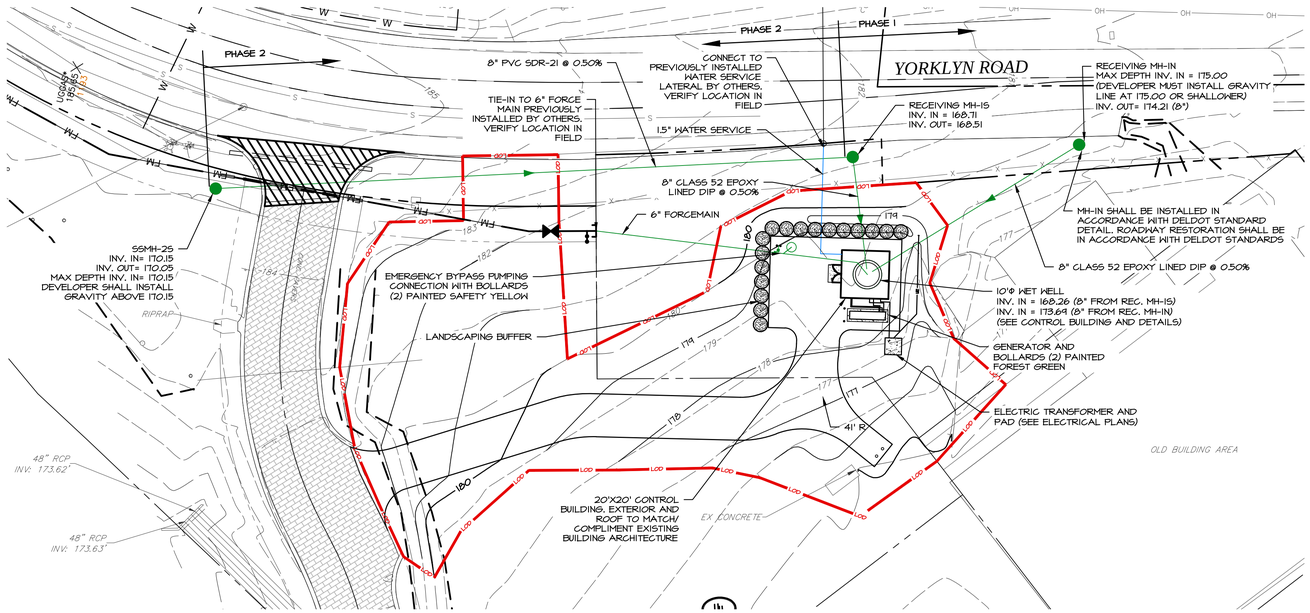
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

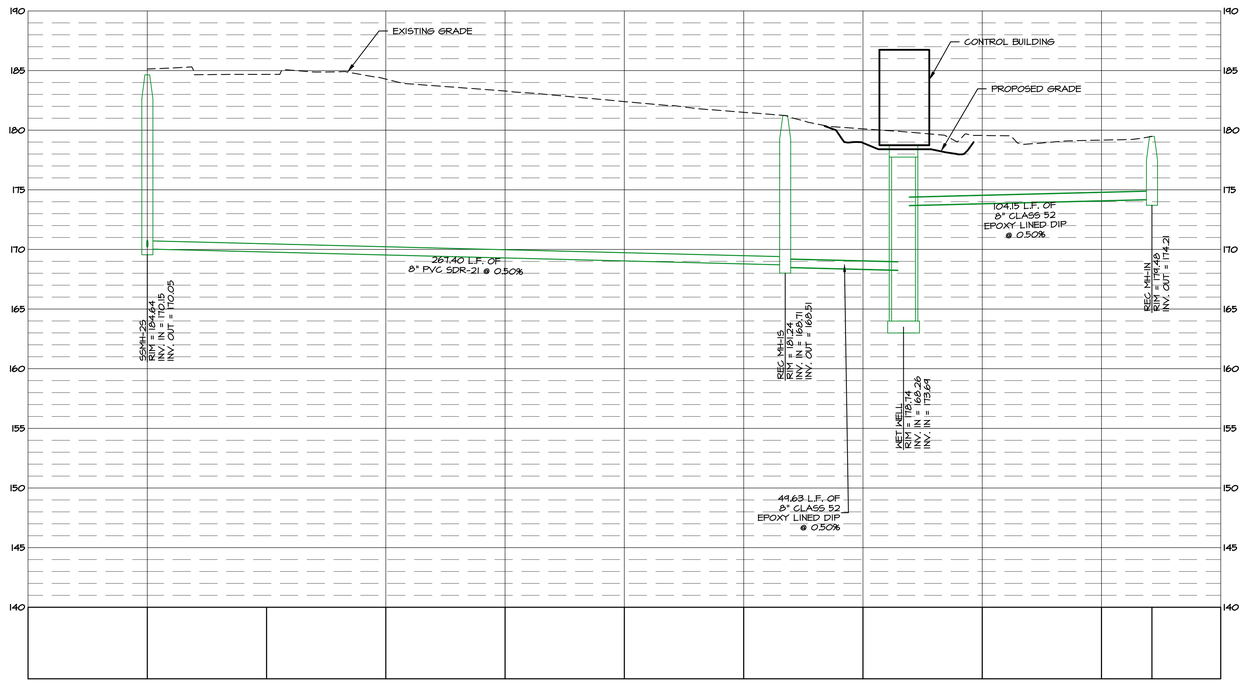
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	MARCH 30, 2021
DESIGNER:	EWB	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1" = 40'

DRAWING NO.
C-11

DRAWING: C:\Users\tmoberholtzer\BIM 360\EA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sediment and Stormwater\Post Construction Drainage Plan.dwg - PLOTTED: Apr 23, 2021 10:05 am





SANITARY SEWER
HORZ. SCALE: 1"=30'
VERT. SCALE: 1"= 6'

UTILITY LEGEND

- EXISTING STORM DRAINAGE PIPING (Headwall, Manhole, Inlet, Endwall, Rip Rap)
- PROPOSED STORM DRAINAGE PIPING (HEADWALL, MANHOLE, INLET, ENDWALL, RIP RAP)
- EXISTING OVERHEAD ELECTRIC (Utility Pole, OH, Electric Meter)
- PROPOSED OVERHEAD ELECTRIC (UTILITY POLE, OHE, TRANSFORMER)
- EXISTING UNDERGROUND ELECTRIC (Utility Pole, UE, Electric Transformer)
- PROPOSED UNDERGROUND ELECTRIC (UTILITY POLE, UE, TRANSFORMER)
- EXISTING UNDERGROUND TELEPHONE (Utility Pole, UT, Manhole, Telephone Box)
- EXISTING GAS LINE (Gas Valve, G, Gas Meter)
- PROPOSED GAS LINE (GAS VALVE, G, GAS METER)
- EXISTING SANITARY SEWER LINE (Clean Out, S, Manhole)
- PROPOSED SANITARY SEWER LINE (MANHOLE, SAN, CLEANOUT)
- EXISTING SANITARY FORCE MAIN (FM, Manhole)
- PROPOSED SANITARY FORCE MAIN (MANHOLE, FM)
- EXISTING WATER LINE (WM, Water Meter, W, Water Valve, WV, Fire Hydrant)
- PROPOSED WATER LINE (WATER VALVE, W, FIRE HYDRANT)
- LIMIT OF DISTURBANCE (LOD, LOD)

NOTES:

1. CONTRACTOR SHALL BE REQUIRED TO COMPLETE ALL LINEAR GRAVITY SANITARY SEWER AND MANHOLE INSTALLATION THAT IS OUTSIDE OF THE PROJECT AREA LIMIT OF DISTURBANCE (LOD) UNDER A SEPARATE MINOR LINEAR UTILITY PLAN PROVIDED BY THE ENGINEER, AND APPROVED BY DNREC SEDIMENT AND STORMWATER. THIS MINOR LINEAR UTILITY WORK OUTSIDE THE PROJECT SITE LOD MUST BE COMPLETED (INCLUDING FINAL RESTORATION) PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES (INCLUDING EROSION AND SEDIMENT CONTROL INSTALLATION).

NORTH

SCALE IN FEET: 1" = 30'

0 15 30 60 90

REVISIONS PER:	DATE:	BY:
1. -	-	-
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4. -	-	-
5. -	-	-

ELA group, inc.
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LITITZ, PA 17543
(717) 626-7271
elagroup.com

ANDREW T. PROSSER LICENSE No. 18486 DELAWARE PROFESSIONAL ENGINEER

FINAL DESIGN SET

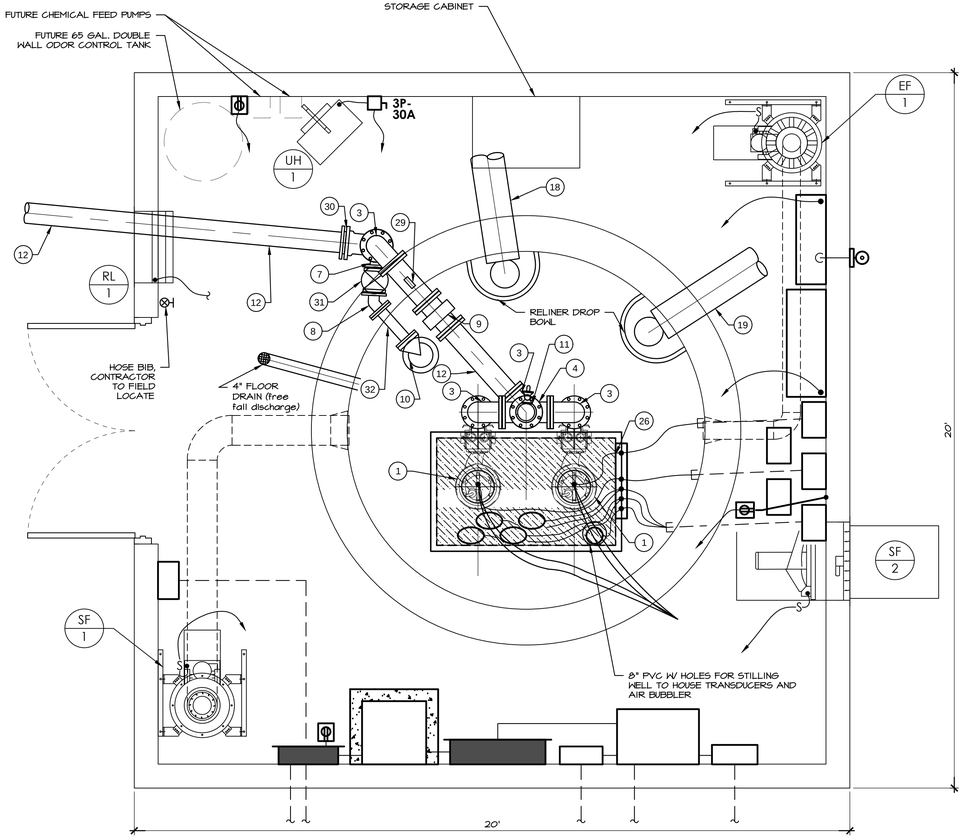
-

SUBJECT:
SANITARY SEWER PLAN & PROFILE
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

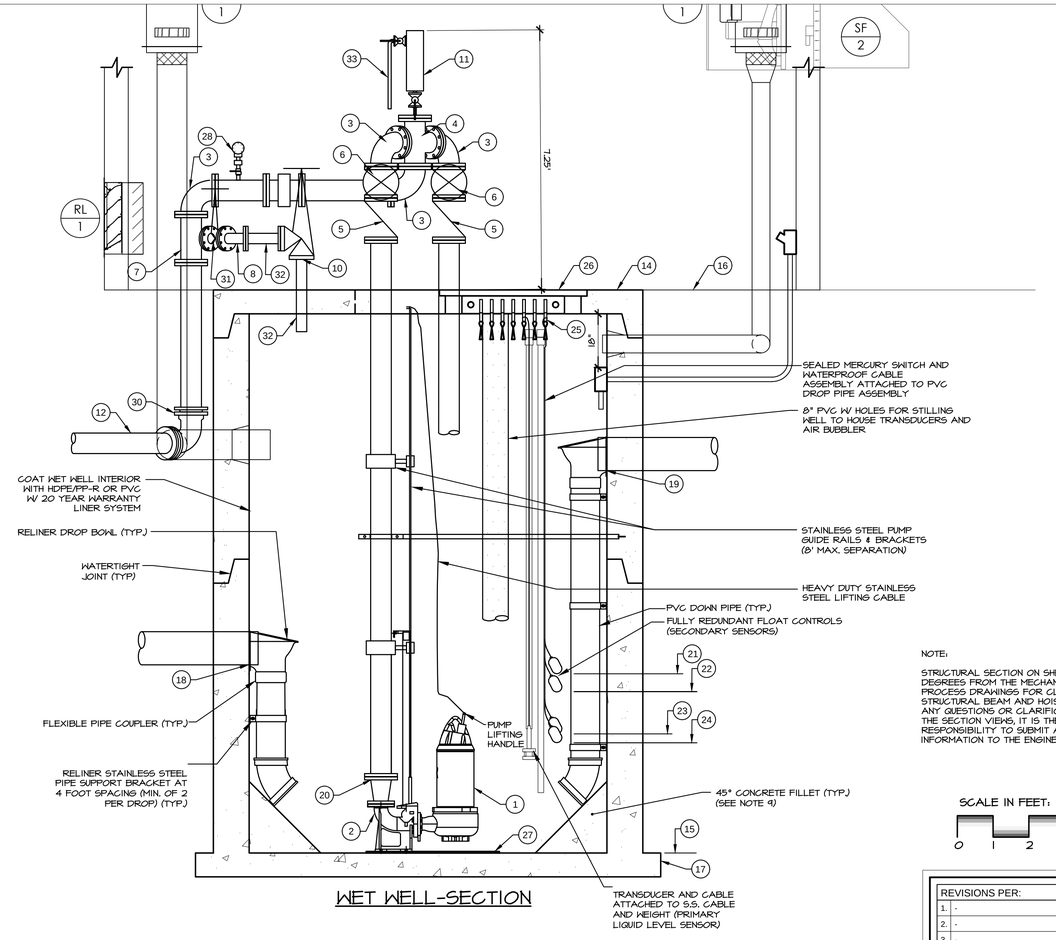
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1" = 30'

DRAWING NO.
P-1



WET WELL-PLAN



WET WELL-SECTION

NOTE:

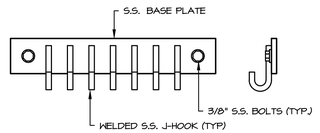
STRUCTURAL SECTION ON SHEET S-5 IS ROTATED 90 DEGREES FROM THE MECHANICAL, ELECTRICAL, AND PROCESS DRAWINGS FOR CLARITY OF THE STRUCTURAL BEAM AND HOIST. IF CONTRACTOR HAS ANY QUESTIONS OR CLARIFICATIONS RELATED TO THE SECTION VIEWS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT A REQUEST FOR INFORMATION TO THE ENGINEER.

SCALE IN FEET: 1/2"=1'-0"

0 1 2 4 6

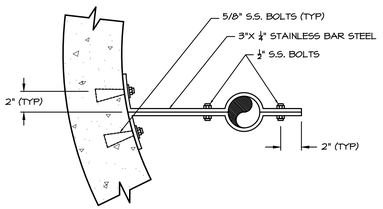
CONTROL BUILDING & WET WELL

SCALE: 1/2"=1'-0"



MULTIPLE CABLE HOOK DETAIL

NO SCALE



WET WELL DISCHARGE PIPE SUPPORT DETAIL

NO SCALE

NOTES:

1. ALL WORK SHALL CONFORM TO THE CONTRACT DOCUMENTS & SPECIFICATIONS.
2. SIZES AND LOCATION OF ALL EQUIPMENT SHOWN IS FOR SCHEMATIC PURPOSES TO SHOW GENERAL ORIENTATION ONLY. CONTRACTOR TO SUBMIT DETAILED SHOP DRAWINGS FOR ALL EQUIPMENT TO THE AUTHORITY FOR APPROVAL PRIOR TO CONSTRUCTION
3. ALL PIPING TO BE FINISH PAINTED PER SPECIFICATIONS. TYP WET WELL AND MANHOLE.
4. ALL NUTS, BOLTS, HARDWARE FASTENERS, CHAINS, & CABLES SHALL BE 304 STAINLESS STEEL.
5. ALL EXPOSED PIPING WITHIN THE WET WELL, METER & VALVE VAULT, AND BY-PASS MANHOLE SHALL BE CLASS 52 EPOXY LINED DI PIPE, AS WELL AS BURIED PIPING WITHIN 3 FT OF THESE STRUCTURES.
6. ALL FORCE MAIN PIPING WITHIN THE METER & VALVE VAULT AND BY-PASS MANHOLE SHALL BE SET AT 0.5% SLOPE, SLOPING BACK TOWARDS THE WET WELL TO AVOID THE FORMATION OF ISOLATED HIGH POINTS.
7. THE WET WELL SHALL BE TREATED WITH TWO (2) COATS OF BITUMASTIC COATING.
8. FLANGED FITTINGS SHALL ONLY BE USED IN AREAS EXPOSED TO AIR AND SHALL HAVE AN 18" MINIMUM CLEARANCE AROUND THE PIPE. ALL BURIED PIPES AND FITTINGS SHALL ONLY USE MECHANICAL JOINTS.
9. THE HORIZONTAL AREA OF THE HOPPER BOTTOM SHALL BE NO GREATER THAN NECESSARY FOR PROPER INSTALLATION AND OPERATIONS OF THE PUMPS.
10. CONTRACTOR SHALL VERIFY ALL EQUIPMENT LOCATIONS, DIMENSIONS, ASSEMBLY AND INSTALLATION INSTRUCTIONS, AND DETAILS FROM THE APPROVED MANUFACTURER'S EQUIPMENT SUBMITTALS ALLOW FOR PROPER INSTALLATION OF EQUIPMENT PRIOR TO WORK FOR INSTALLATION OCCURRING.
11. CONTRACTOR SHALL FIELD CHECK AND VERIFY ALL EXISTING AND RECENTLY CONSTRUCTED CONDITIONS AND DIMENSIONS AT THE SITE PRIOR TO INSTALLATION OF EQUIPMENT.
12. REFER TO THE ELECTRICAL DRAWINGS FOR ELECTRICAL CONNECTIONS, DETAILS, AND SCHEDULES.
13. REFER TO THE MECHANICAL DRAWINGS FOR HVAC SYSTEM LAYOUTS, DETAILS, AND SCHEDULES.
14. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING CONSTRUCTION AND LAYOUT PLANS, SECTIONS, ELEVATIONS, AND DETAILS.
15. CONTRACTOR SHALL PROVIDE FLANGED SPOOL PIPE FOR METER IN THE EVENT IT EVER NEEDS REMOVED FOR A LONG PERIOD OF TIME.
16. EACH PUMP POWER CABLE SHALL BE SUPPORTED ON A SEPARATE 3/8" TYPE STAINLESS STEEL HOOK LOCATED WITHIN 6 INCHES OF GUIDE RAIL BRACKET FOR EACH PUMP. EACH PUMP POWER CABLE SHALL BE RUN AS NOT TO RESTRICT REMOVAL OF PUMPS.
17. ALL PIPE 3" AND LARGER SHALL BE FLANGED AND SHALL MEET ANSI B16. CLASS 125.
18. ALL PIPE 2" AND SMALLER SHALL BE THREADED, ASTM A312 GRADE, TP304 SCH 40 STAINLESS STEEL.
19. DRAIN AND VENT LINES SHALL BE SCH80 PVC AND SHALL BE GRAY IN COLOR.
20. AIR BUBBLER SYSTEM SHALL HAVE A ¼" LINE AND SHALL HAVE A ¾" CONDUIT. AND SHALL BE INSTALLED IN THE STILLING WELL WITHIN THE WET WELL.
21. SUBMERSIBLE TRANSDUCER SHALL BE INSTALLED WITHIN THE STILLING WELL WITHIN THE WET WELL.
22. PIPE COUPLINGS SHALL BY TYLER SOLID LONG SLEEVE MODEL 5144-L.
23. ALL SUCTION AND DISCHARGE PIPING SHALL BE FLANGED, CLASS 52-DIP CONFORMING TO AWWA C150 AND C151.
24. PIPE HANGERS AND SUPPORTS SHALL BE CONSTRUCTED OF HEAVY DUTY WELDED STEEL BRACKETS MADE OF 304SS. U-BOLTS SHALL ALSO BE MADE OF 304SS WITH DOUBLE HEX NUTS AND SHALL COMPLY WITH FEDERAL SPECIFICATION WW-H-171E (TYPE 24) AND MANUFACTURER'S STANDARDIZATION SOCIETY SP-69(TYPE 24). BRACKETS AND U-BOLTS SHALL BE MANUFACTURED BY ITT GRINNEL OR APPROVED EQUAL.

GENERAL NOTES:

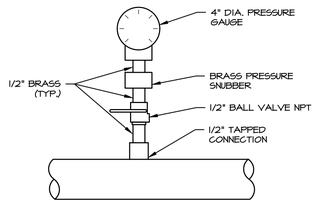
1. CONTRACTOR SHALL VERIFY ALL EQUIPMENT LOCATIONS, DIMENSIONS, ASSEMBLY AND INSTALLATION INSTRUCTIONS, AND DETAILS FROM THE APPROVED MANUFACTURER'S EQUIPMENT SUBMITTALS ALLOW FOR PROPER INSTALLATION OF EQUIPMENT PRIOR TO WORK FOR INSTALLATION OCCURRING.
2. CONTRACTOR SHALL FIELD CHECK AND VERIFY ALL EXISTING AND RECENTLY CONSTRUCTED CONDITIONS AND DIMENSIONS AT THE SITE PRIOR TO INSTALLATION OF EQUIPMENT.
3. REFER TO THE ELECTRICAL DRAWINGS FOR ELECTRICAL CONNECTIONS, DETAILS, AND SCHEDULES.
4. REFER TO THE MECHANICAL DRAWINGS FOR HVAC SYSTEM LAYOUTS, DETAILS, AND SCHEDULES.
5. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING CONSTRUCTION AND LAYOUT PLANS, SECTIONS, ELEVATIONS, AND DETAILS.

LINK-SEAL NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL LINK-SEALS WITH SLEEVES AT ALL PIPE PENETRATIONS. SLEEVES SHALL BE PRECAST INTO WET WELL, METER & VALVE VAULT AND BY-PASS MANHOLE. (NO COLD JOINTS), TO BECOME AN INTEGRAL PART OF THE CONCRETE. GROUTING SLEEVES IN PLACE WITH COLD JOINTS WILL NOT BE ACCEPTABLE.
2. AN ALTERNATIVE TO PRECAST SLEEVE IS FOR THE CONTRACTOR TO CORE DRILL ALL PIPE PENETRATIONS IN THE CORRECT LOCATION AND INSTALL LINK-SEALS
3. CONTRACTOR SHALL DETERMINE CORRECT SIZE OF ALL LINK-SEALS, SLEEVES AND CORE DRILLING.
4. ALL SHOP DRAWINGS SHALL SHOW AND CALL OUT LOCATION OF PRECAST SLEEVES OR CORE DRILLING TO ENSURE REBAR IS NOT IN CONFLICT WITH ANY PENETRATIONS.

ITEM NO.	DESCRIPTION	SIZE/ DIMENSION	ELEVATION
1	SUBMERSIBLE PUMP - 40HP		
2	4X4 NO SPARKING BREAK AWAY FITTING WITH BASE ELBOW		
3	FLANGED 90° ELBOW	6"	
4	FLANGED CROSS	6"	
5	FLANGED CHECK VALVE, GA 250-DS	6"	
6	FLANGED GATE VALVE, US PIPE METROSEAL 250	6"	
7	FLANGED TEE	6"X6"X3"	
8	FLANGED 45° ELBOW	3"	
9	MAG METER, SIEMENS 5100	6"	
10	FLANGED SURGE ANTICIPATOR & PRESSURE RELIEF VALVE, ANGLE BODY, GA 625-D	3"	
11	AIR RELEASE & VACUUM VALVE, GA 945F	2" NPT	
12	CLASS 52 EPOXY LINED DI PIPE, FLANGED	6"	
13	PRECAST CONCRETE WET WELL	10'-0" I.D.	
14	TOP OF WET WELL		EL.= 178.74
15	BOTTOM OF WET WELL		EL.= 163.00
16	FINISHED FLOOR		EL.= 178.74
17	PRECASE FLANGED BASE	8" MIN.	
18	CLASS 52 EPOXY LINED DI INFLUENT SEWER	8"	I.E.= 168.26
19	CLASS 52 EPOXY LINED DI INFLUENT SEWER	8"	I.E.= 173.69
20	FLANGED REDUCER	6"X4"	
21	HIGH WATER ALARM		EL.= 168.01

ITEM NO.	DESCRIPTION	SIZE/ DIMENSION	ELEVATION
22	LEAD PUMP ON		EL.= 167.51
23	PUMPS OFF		EL.= 166.33
24	LOW WATER ALARM/BACK UP FLOAT PUMP OFF		EL.= 166.08
25	SS J HOOK MOUNTED TO WALL (SEE DETAIL)		
26	ALUMINUM ACCESS HATCH	36"X60"	
27	S.S. PLATE (REQ'D FOR PROPER PUMP CLEARANCE	1/2"	
28	PRESSURE GAUGE ASSEMBLY (SEE DETAIL)		
29	M.J. 22 1/2° ELBOW	6"	
30	M.J. 90° ELBOW	6"	
31	FLANGED GATE VALVE, US PIPE METROSEAL 250	3"	
32	CLASS 52 EPOXY LINED DI PIPE, FLANGED	3"	
33	SCH 80 PVC	1"	



PRESSURE GAUGE

NO SCALE

REVISIONS PER:	DATE:	BY:
1. -	-	-
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elagroup.com

ANDREW T. PROSSER LICENSED DELAWARE PROFESSIONAL ENGINEER No. 18486

FINAL DESIGN SET

-

SUBJECT:
CONTROL BUILDING
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	1/2"=1'-0"

DRAWING NO.
P-2

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sanitary Sewer\CONTROL BLDG.dwg - PLOTTED: Apr 23, 2021 9:15 am

Project No: 1179-001
Project Name: NVF Pump Station
Prepared By: ATP
Checked By: N/A
Date: 3/31/2021

TOTAL PUMPING SYSTEM FRICTION LOSSES

I. Pipe & Fitting Friction Losses (Individual Pump Risers)

*Table 5.1: Values of c for Various Materials

Types of Pipe	Values Used for Design Purposes
Cement-asbestos	140
Cement lining	140
Copper, brass, plastic	130
Iron, steel, cast iron	100

*Sizing Water Service Lines and Meters, AWWA M22, copyright 1975

ND (Pipe Nominal Diameter) = 6.00 inches
ID (Pipe Internal Diameter) = 6.16 inches
Pipe Material Type = DIP-EL

c = 120 *(high pipe roughness coefficient - for analysis of an aged system)*
c = 140 *(design roughness coefficient)*
c = 150 *(low roughness coefficient - for analysis of a new system)*

Minimum Instantaneous Flow = 230 gpm *(peaking factor of 4)*
q (flow demand) = **275 gpm** *(based on pump rate or 2 ft/s min scour)*
Average Fluid Velocity = 2.96 ft/s

Hazen-Williams Equation *(design roughness coefficient example)*

$f_{(design)}$ = Friction Head (ft liquid/100 ft)

$$f_{(design)} = 0.2083 \frac{(100)^{1.85} \times q^{1.85}}{(c)^{1.85} \times d^{4.8655}}$$

$$f_{(design)} = 0.2083 \frac{(100)^{1.85} \times 32.566}{9{,}340 \times 6.946}$$

$f_{(design)}$ = 0.52 ft of head loss per 100 ft of pipe

$f_{(high)}$ = 0.70 ft of head loss per 100 ft of pipe
$f_{(low)}$ = 0.46 ft of head loss per 100 ft of pipe

A. Pipe Friction Losses:

Total Pipe Length = 150 feet

Total Pipe Head Loss

$c_{(design)}$ = 140	=	**0.79 feet**	*0.52 ft x Equivalent 100 ft of Pipe Length*
$c_{(high)}$ = 120	=	1.05 feet	*0.70 ft x Equivalent 100 ft of Pipe Length*
$c_{(low)}$ = 150	=	0.69 feet	*0.46 ft x Equivalent 100 ft of Pipe Length*

Project No: 1179-001
Project Name: NVF Pump Station
Prepared By: ATP
Checked By: N/A
Date: 3/31/2021

TOTAL PUMPING SYSTEM FRICTION LOSSES

II. Pipe & Fitting Friction Losses (Pump Tee in Wet Well to Discharge)

*Table 5.1: Values of c for Various Materials

Types of Pipe	Values Used for Design Purposes
Cement-asbestos	140
Cement lining	140
Copper, brass, plastic	130
Iron, steel, cast iron	100

*Sizing Water Service Lines and Meters, AWWA M22, copyright 1975

ND (Pipe Nominal Diameter) = 6.00 inches
ID (Pipe Internal Diameter) = 6.09 inches
Pipe Material Type = Fusible PVC C900 DR-18

c = 120 *(high pipe roughness coefficient - for analysis of an aged system)*
c = 140 *(design roughness coefficient)*
c = 150 *(low roughness coefficient - for analysis of a new system)*

Minimum Instantaneous Flow = 230 gpm *(peaking factor of 4)*
q (flow demand) = **275 gpm**
Average Fluid Velocity = 3.03 ft/s

Hazen-Williams Equation (design roughness coefficient example)

$f_{(design)}$ = Friction Head (ft liquid/100 ft)

$$f_{(design)} = 0.2083 \frac{(100)^{1.85} \times q^{1.85}}{(c)^{1.85} \times d^{4.8655}}$$

$$f_{(design)} = 0.2083 \frac{(100)^{1.85} \times 32.566}{9{,}340 \times 6{,}570}$$

$f_{(design)}$ = 0.55 ft of head loss per 100 ft of pipe

$f_{(high)}$ = 0.74 ft of head loss per 100 ft of pipe
$f_{(low)}$ = 0.49 ft of head loss per 100 ft of pipe

A. Pipe Friction Losses:

Total Pipe Length = 6,100 feet

Total Pipe Head Loss

$c_{(design)}$ = 140	=	**33.80 feet**	*0.55 ft x Equivalent 100 ft of Pipe Length*
$c_{(high)}$ = 120	=	44.95 feet	*0.74 ft x Equivalent 100 ft of Pipe Length*
$c_{(low)}$ = 150	=	29.75 feet	*0.49 ft x Equivalent 100 ft of Pipe Length*

Project No: 1179-001
Project Name: NVF Pump Station
Prepared By: ATP
Checked By: N/A
Date: 3/31/2021

TOTAL PUMPING SYSTEM FRICTION LOSSES

III. Total Pipe & Fitting Friction Losses

Total Head Loss (I + II)

$c_{(design)}$ = 140	=	**36.21 feet**
$c_{(high)}$ = 120	=	48.16 feet
$c_{(low)}$ = 150	=	31.87 feet

IV. Elevational Losses

Center Elev. of Pump Intake = 166.08 ft above MSL
Highest Elev. along Force Main Route = 310.50 ft above MSL

Total Head Loss = 144.42 feet

V. Equipment Losses

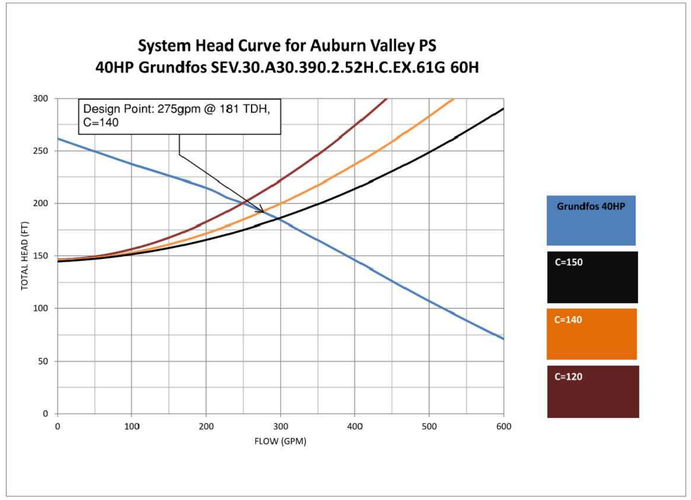
Equipment Type	Quantity	Size	Flow Rate at Equipment (gpm)	Pressure Loss (psi)
Meter				
Other:				
Other:				
Other:				
Other:				
Other:				
Other:				

Total Head Loss = 0.00 feet

VII. Total Pumping System Friction Losses

Total Head Loss (IV + V + VI)

$c_{(design)}$ = 140	=	**180.63 feet**
$c_{(high)}$ = 120	=	192.58 feet
$c_{(low)}$ = 150	=	176.29 feet



Project No: 1179-001
Project Name: NVF Pump Station
Prepared By: ATP
Checked By: N/A
Date: 3/31/2021

B. Valve and Fitting Friction Losses

*Table 5.9: Approximate Friction Head of Valves and Fittings in Equivalent Feet of Straight Pipe

Pipe Size (in)	Corp Stop (ft)	Curb Stop (ft)	Gate Valve (ft)	Globe Valve (ft)	Angle Valve (ft)	Swing Check (ft)	Short Ell (ft)	Long Ell (ft)	45 Deg Bend (ft)	Tee-side Outlet (ft)
1/2	6.1	3.1	0.4	16	8	3	1.5	1.1	0.8	3
3/4	5.9	4.0	0.5	22	12	5	2.2	1.4	1.0	5
1	6.7	3.8	0.6	27	15	7	2.7	1.7	1.3	6
1 1/4	7.5	3.6	0.8	37	18	8	3.7	2.4	1.6	8
1 1/2	7.7	4.4	1.0	44	22	10	4.3	2.8	2.0	9
2	8.4	4.8	1.2	57	28	13	5.5	3.5	2.5	11
2 1/2	-----	-----	1.4	66	33	17	6.5	4.2	3.0	14
3	-----	-----	1.7	85	42	20	8.1	5.1	3.8	17
3 1/2	-----	-----	2.0	99	50	23	9.5	6.0	4.4	19
4	-----	-----	2.3	110	58	27	11.0	7.0	5.0	22
5	-----	-----	2.9	140	70	33	14.0	8.9	6.1	27
6	-----	-----	3.5	160	83	40	16.0	11.0	7.7	33
8	-----	-----	4.5	220	110	53	21.0	14.0	10.0	43
10	-----	-----	5.7	290	140	67	26.0	17.0	13.0	56
12	-----	-----	6.7	340	170	80	32.0	20.0	15.0	66

*Sizing Water Service Lines and Meters, AWWA M22, copyright 1975

6.2 inch Pipe Fixtures	# of Fixture		Equiv. Pipe			Total Length
45 Deg Bend (ft) =	1	x	7.7	ft	=	7.7 ft
Swing Check (ft) =	1	x	40.0	ft	=	40 ft
Short Ell (ft) =	5	x	5.5	ft	=	27.5 ft
Long Ell (ft) =		x	11.0	ft	=	0 ft
Tee-side Outlet (ft) =	4	x	33.0	ft	=	132 ft
Gate Valve (ft) =	1	x	3.5	ft	=	3.5 ft
						210.7 ft

Total Valve & Fitting Head Loss

$c_{(design)}$ = 140	=	**1.10 feet**	*0.52 ft x Equivalent 100 ft of Pipe Length*
$c_{(high)}$ = 120	=	1.47 feet	*0.70 ft x Equivalent 100 ft of Pipe Length*
$c_{(low)}$ = 150	=	0.97 feet	*0.46 ft x Equivalent 100 ft of Pipe Length*

C. Total Pipe, Valve, & Fitting Friction Losses

Total Head Loss (A + B)

$c_{(design)}$ = 140	=	**1.89 feet**
$c_{(high)}$ = 120	=	2.51 feet
$c_{(low)}$ = 150	=	1.66 feet

Project No: 1179-001
Project Name: NVF Pump Station
Prepared By: ATP
Checked By: N/A
Date: 3/31/2021

B. Valve and Fitting Friction Losses

*Table 5.9: Approximate Friction Head of Valves and Fittings in Equivalent Feet of Straight Pipe

Pipe Size (in)	Corp Stop (ft)	Curb Stop (ft)	Gate Valve (ft)	Globe Valve (ft)	Angle Valve (ft)	Swing Check (ft)	Short Ell (ft)	Long Ell (ft)	45 Deg Bend (ft)	Tee-side Outlet (ft)
1/2	6.1	3.1	0.4	16	8	3	1.5	1.1	0.8	3
3/4	5.9	4.0	0.5	22	12	5	2.2	1.4	1.0	5
1	6.7	3.8	0.6	27	15	7	2.7	1.7	1.3	6
1 1/4	7.5	3.6	0.8	37	18	8	3.7	2.4	1.6	8
1 1/2	7.7	4.4	1.0	44	22	10	4.3	2.8	2.0	9
2	8.4	4.8	1.2	57	28	13	5.5	3.5	2.5	11
2 1/2	-----	6.0	1.4	66	33	17	6.5	4.2	3.0	14
3	-----	-----	1.7	85	42	20	8.1	5.1	3.8	17
3 1/2	-----	-----	2.0	99	50	23	9.5	6.0	4.4	19
4	-----	-----	2.3	110	58	27	11.0	7.0	5.0	22
5	-----	-----	2.9	140	70	33	14.0	8.9	6.1	27
6	-----	-----	3.5	160	83	40	16.0	11.0	7.7	33
8	-----	-----	4.5	220	110	53	21.0	14.0	10.0	43
10	-----	-----	5.7	290	140	67	26.0	17.0	13.0	56
12	-----	-----	6.7	340	170	80	32.0	20.0	15.0	66

*Sizing Water Service Lines and Meters, AWWA M22, copyright 1975

6.1 inch Pipe Fixtures	# of Fixture		Equiv. Pipe			Total Length
45 Deg Bend (ft) =	7	x	7.7	ft	=	53.9 ft
Swing Check (ft) =	0	x	40.0	ft	=	0 ft
Long Ell (ft) =	0	x	11.0	ft	=	0 ft
Tee-side Outlet (ft) =	1	x	33.0	ft	=	33 ft
Gate Valve =	2	x	3.5	ft	=	7 ft
						93.9 ft

Total Valve & Fitting Head Loss

$c_{(design)}$ = 140	=	**0.52 feet**	*0.55 ft x Equivalent 100 ft of Pipe Length*
$c_{(high)}$ = 120	=	0.69 feet	*0.74 ft x Equivalent 100 ft of Pipe Length*
$c_{(low)}$ = 150	=	0.46 feet	*0.49 ft x Equivalent 100 ft of Pipe Length*

C. Total Pipe, Valve, & Fitting Friction Losses

Total Head Loss (A + B)

$c_{(design)}$ = 140	=	**34.32 feet**
$c_{(high)}$ = 120	=	45.64 feet
$c_{(low)}$ = 150	=	30.21 feet

Project No: 1179-001
Project Name: NVF Pump Station
Prepared By: ATP
Checked By: N/A
Date: 3/31/2021

VIII. NET POSITIVE SUCTION HEAD ANALYSIS

A. NPSH Required

Pump Manufacturer: Grundfos
Pump Model: SEV.30.A30.390.2.52H.C.EX.61G 60H
Max Pump Flow: 275 gpm
NPSH (R): 6.5 ft *(from manufacturer)*

B. NPSH Available

Pump Altitude: 166.08 ft (above sea level)
Fluid Temp: 55 F

NPSH (A) = 34.03 ft (Net Positive Suction Head Available)
H_s = 33.7 ft (Absolute pressure on fluid, see **Table 1** for open systems)
H_a = 0.78 ft (Static suction pressure, min water depth above the center of pump discharge)
H_{vpa} = 0.49 ft (Vapor Pressure of fluid, see **Table 2**)
H_f = 0.00 ft (Friction losses in the suction pipe)

NPSH (A) = H_s + H_a - H_{vpa} - H_f

NPSH (A) = 33.7 + 0.78 - 0.49 - 0.00

NPSH (A) = 34.03 ft

C. NPSH Energy Rule Verification

NPSH (A) > NPSH (R)

34.03 > **6.5** ✓

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

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ENGINEERS + LANDSCAPE ARCHITECTS

ANDREW T. PROSSER
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

FINAL DESIGN SET

-

SUBJECT:
SYSTEM HEAD CURVE AND CALCS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NO SCALE

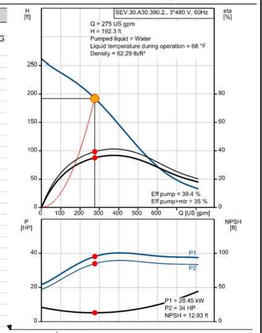
DRAWING NO.
P-3

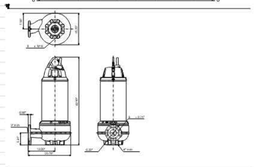
DRAWING: G:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sanitary Sewer\CONTROL BLDG.dwg - PLOTTED: Apr 23, 2021 9:14 am

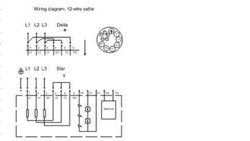
GRUNDFOS

Company name:	Municipal Maintenance Co.	**Project:**	NVF Pump Station
Created by:	Daniel Hennessy	**Reference number:**	R200351
Phone:	8567869434	**Client:**	New Castle County
Email:	dhennessy@mmc-nj.com	**Client number:**	ELA Group, Inc
Date:	4/1/2021	**Contact:**	Andrew Prosser, PE

Description	Value
General information:	
Product name:	SEV.30.A30.390.2.52H.C.EX.61G
Product No.:	On request
EAN:	On request
Technical:	
Actual calculated flow:	275 US gpm
Maximum flow:	810 US gpm
Max flow:	810 US gpm
Resulting head of the pump:	192.3 ft
Head max:	236.2 ft
Type of impeller:	Super Vortex
Maximum particle size:	3 1/8 in
Primary shaft seal:	SIC-SIC
Secondary shaft seal:	SIC-CARBON
Curve tolerance:	ANSI/HI11.6:2017 3B
Cooling jacket:	with cooling jacket
Materials:	
Pump housing:	Cast iron
Pump housing:	EN 1561 EN-GJL-250
Pump housing:	ASTM ASTM A48 35B
Impeller:	Cast iron
Impeller:	EN 1563 EN-GJS-500-7
Impeller:	ASTM ASTM A536 70-50-05
Motor:	Cast iron
Motor:	EN 1561 EN-GJL-250
Motor:	ASTM ASTM A48 35B
Installation:	
Maximum ambient temperature:	104 °F
Flange standard:	ANSI
Pump inlet:	4 inch
Pump outlet:	3 inch
Pressure stage:	PN 10
Maximum installation depth:	65.6 ft
Installation:	C
Inst dry/wet:	D/S
Installation:	vertical
Auto-coupling:	97626239
Inst vertical:	96845469
Base stand:	97632229
Frame range:	52
Liquid:	
Pumped liquid:	Water
Liquid temperature range:	32 .. 104 °F
Selected liquid temperature:	68 °F
Density:	62.29 lb/ft³
Electrical data:	
Power input - P1:	32.5 kW
Rated power - P2:	38.9 HP
Main frequency:	60 Hz
Rated voltage:	3 x 380-480/660-690 V
Voltage tolerance:	+10/-10 %
Max starts per. hour:	20
Rated current:	61-49/36-34 A
Maximum current consumption:	51 A







GRUNDFOS

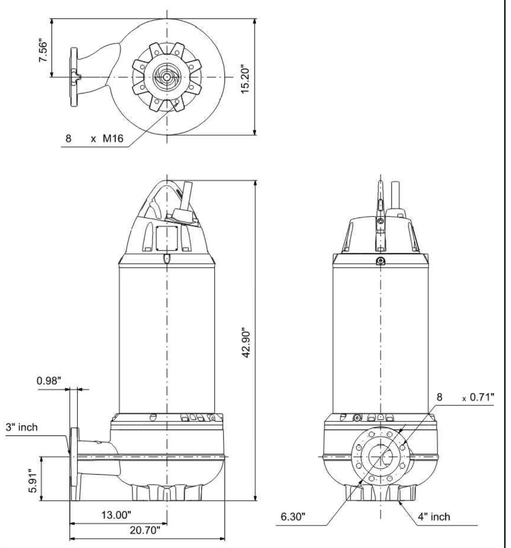
Company name:	Municipal Maintenance Co.	**Project:**	NVF Pump Station
Created by:	Daniel Hennessy	**Reference number:**	R200351
Phone:	8567869434	**Client:**	New Castle County
Email:	dhennessy@mmc-nj.com	**Client number:**	ELA Group, Inc
Date:	4/1/2021	**Contact:**	Andrew Prosser, PE

Description	Value
Starting current:	572/262 A
Rated current at no load:	21.6 A
Rated speed:	3551 rpm
Motor efficiency at full load:	89 %
Motor efficiency at 3/4 load:	89 %
Motor efficiency at 1/2 load:	87 %
Number of poles:	2
Start. method:	star/delta
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	H
Explosion proof:	yes
Ex-protection standard:	Y
Motor protection:	KLIXON
Length of cable:	49.2 ft
Cable type:	S1BN8-F
Cable size:	7X10 + 5X1.5
Cable resistance:	1.91 mOhm/m
Winding resistance:	0.260 Ohm
Cos phi 1/1:	0.81
Cos phi 1/2:	0.64
Cos phi 3/4:	0.76
Controls:	
Moisture sensor:	with moisture sensors
Others:	
Net weight:	739 lb
Sales region:	Namreg
Custom tariff no.:	8413.70.2040

GRUNDFOS

Company name:	Municipal Maintenance Co.	**Project:**	NVF Pump Station
Created by:	Daniel Hennessy	**Reference number:**	R200351
Phone:	8567869434	**Client:**	New Castle County
Email:	dhennessy@mmc-nj.com	**Client number:**	ELA Group, Inc
Date:	4/1/2021	**Contact:**	Andrew Prosser, PE

On request SEV.30.A30.390.2.52H.C.EX.61G 60 Hz

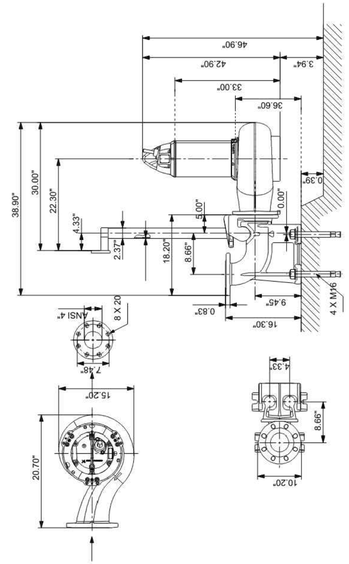


Note! All units are in [in] unless otherwise stated.
Disclaimer: This simplified dimensional drawing does not show all details.

GRUNDFOS

Company name:	Municipal Maintenance Co.	**Project:**	NVF Pump Station
Created by:	Daniel Hennessy	**Reference number:**	R200351
Phone:	8567869434	**Client:**	New Castle County
Email:	dhennessy@mmc-nj.com	**Client number:**	ELA Group, Inc
Date:	4/1/2021	**Contact:**	Andrew Prosser, PE

On request SEV.30.A30.390.2.52H.C.EX.61G 60 Hz



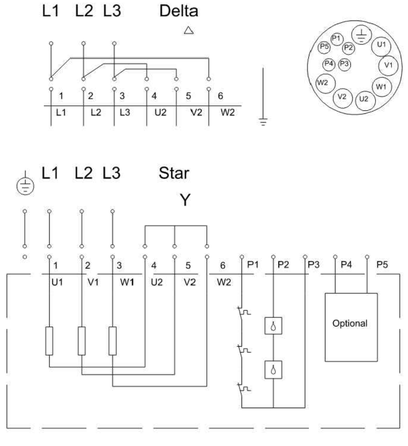
Note! All units are in [in] unless otherwise stated.
Disclaimer: This simplified dimensional drawing does not show all details.

GRUNDFOS

Company name:	Municipal Maintenance Co.	**Project:**	NVF Pump Station
Created by:	Daniel Hennessy	**Reference number:**	R200351
Phone:	8567869434	**Client:**	New Castle County
Email:	dhennessy@mmc-nj.com	**Client number:**	ELA Group, Inc
Date:	4/1/2021	**Contact:**	Andrew Prosser, PE

On request SEV.30.A30.390.2.52H.C.EX.61G 60 Hz

Wiring diagram. 12-wire cable



All units are [in] unless otherwise presented.

Project Name: NVF Pump Station 230gpm 10D
Revision Date: 3/31/2021
Designed By: ATP
Reviewed By: JWS

A. WET WELL SIZING & FLOAT ELEVATION DESIGN

Variable List

V = 693.2 gal *(drawndown volume)*
q = 275.0 gpm *(Pump discharge rate)*
Q = 230.0 gpm *(Inflow rate into the wet well)*
n = 6 average # of pump starts per hour
t = 10 minutes *(Min. time of one pumping cycle, (time to fill) + (run time))*

d = 10 ft (wet well diameter, leave blank if rectangular)
A = 1.17 SF horizontal area of rectangular wet well

n= No. of Units
Q_n= Flow per Unit (gpd)
$Q_{projected}$= gpd
Q= 82,800 gpd *(flow to the pump)*

F_p= 4 peaking factor
t_d= 24 hrs *(duration of sewage generation per day)*
Q= 57.5 gpm
Q_p= 230.0 gpm

331,200gpd Peak

(1) Min. Pump Volume Required to Meet Average # of Pump Cycles/Hour

$$V = \frac{t \times q}{4}$$

$$V = \frac{10 \times 275.0}{4}$$

V = 688 gal

Variable	Required	
Cycle Time (Tc)	18.4	>= 10 minutes
Volume (V)	693	gallons
Flow In (Qin)	230	gpm
Pump Flow (Qpump)	275	gpm

$$T_c \geq \frac{V}{Q_{in}} + \frac{V}{Q_{pump} - Q_{in}}$$

(2) Wet Well Stage Storage

V_s = (PI) x r^2
Vs = (PI) x 5^2
V_s = 78.5 CF per ft of manhole depth
587.5 gal/ft of manhole depth

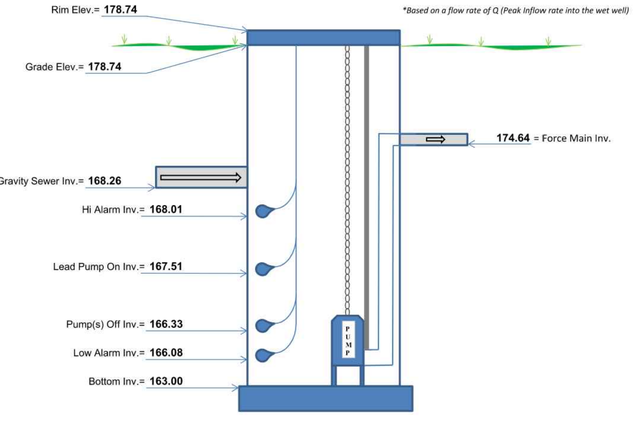
(3) Min. Height of Pump #1 "ON" float from Pump "OFF" float to Meet Avg. # of Pump Cycles/Hour

h_1 = 687.5 gal/pump cycle / 587.5 gal/ft of manhole depth
h_1 = 1.17 ft
Say: 1.18 ft ⇨ Allows for: **693.2 gal pump cycle volume**

(4) Float & Wetwell Design

Grade Elev. = 178.74 ft above MSL
Rim Height above Grade = 0.00 in
Inv. In Elev. = 168.26 ft above MSL
Depth of Gravity Sewer = 10.48 ft
Inv. Out Elev. = 174.64 ft above MSL
Force Main Diameter = 6 in *(nominal)*
Depth of Force Main = 3.60 ft
Total Depth of Manhole 15.74 ft

Min. Pump Suction Clearance = 4.00 in *(from wet well bottom to pump intake)*
Pump Height = 49.00 in *(from pump intake to top of lifting handle)*
Dist. from Pump Off to Low Alarm = 0.25 ft
Wet Well Min. Liquid Depth = 40.00 in *(Pump Off height)*
Dist. from Lag Pump On to Hi Alarm = 0.00 ft
0.50 ft
0.25 ft *(from Hi Alarm to Gravity Sewer Inv.)*



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1. -	-	-
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5. -	-	-

ELA group, inc.
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(717) 626-7271
elagroup.com

ANDREW T. PROSSER
LICENSE
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

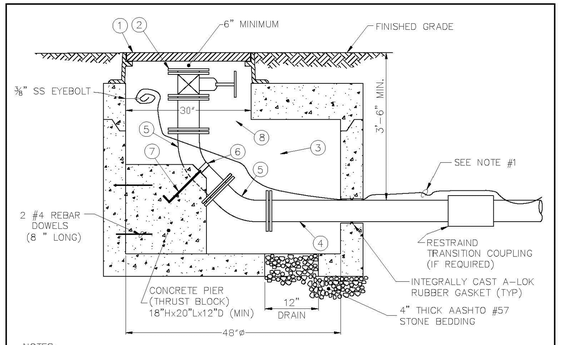
FINAL DESIGN SET

-

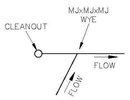
SUBJECT:
SYSTEM HEAD CURVE AND CALCS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NO SCALE

DRAWING NO.
P-4



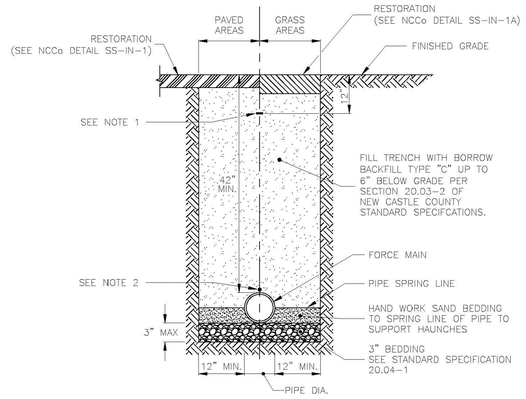
NOTES:
1. TRACER WIRE TO RUN ALONG ENTIRE LENGTH OF F.M. AND TO BE ACCESSIBLE TO TOP COVER. CONTRACTOR MUST PERFORM ELECTRICAL CONTINUITY TEST BEFORE ACCEPTANCE.
2. ALL NUTS & BOLTS SHALL BE STAINLESS STEEL.
3. FIRST LENGTH OF PIPE FROM CLEANOUT, THROUGH THE MANHOLE WALL SHALL BE DUCTILE IRON PIPE (DIP). TRANSITION COUPLING SHALL BE EBAA IRON MEGA-COUPLING OR APPROVED EQUIVALENT
4. ALL DIP SHALL BE COATED WITH 2 COATS ASPHALTIC COATING.
5. NCC MAY REQUIRE A BURIED VALVE(S) FOR CERTAIN FORCE MAIN CONDITIONS (SEE NCCo STANDARD DETAIL SS-FM-6).
5. KNOT TRACER WIRE AROUND EYEBOLT AND COIL ENOUGH WIRE TO EXTEND 12" ABOVE GROUND
6. EYEBOLT SHALL BE WITHIN 3 INCHES MANHOLE COVER



PLAN VIEW

ITEM	DESCRIPTION
①	N.C.C STD. M.H. COVER & FRAME-DETAIL (SEE SS-MH-9)
②	4" OR 6" BLIND FLANGE C.I.
③	4" OR 6" DIP (FJxPE) WITH FLANGE ADAPTER
④	4" OR 6" DIP (PExPE) WITH FLANGE ADAPTER & RETAINER GLAND
⑤	4" OR 6" DIP 45° BEND (FJxFJ)
⑥	PIPE STRAP - S.S. MIN. 1" WIDE, MIN. 1/8" THICK
⑦	J-ANCHOR - S.S., MIN. 10" LONG, 3/8" DIAMETER
⑧	GATE VALVE FLG X FLG RESILENT WEDGE

SS-FM-1 | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | TERMINAL CLEANOUT FORCE MAIN 3"ø AND GREATER | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-FM-1 | LAST REVISED: 3/17/2015



NOT TO SCALE

NOTES:
1. UNDERGROUND MARKING TAPE SHALL BE A (2", 3", 4", 6", OR 12" WIDTH), DETECTABLE MARKING TAPE, WITH A MINIMUM 5.0 MIL OVERALL THICKNESS. TAPE SHALL BE MANUFACTURED USING A 0.8 MIL CLEAR VIRGIN POLYPROPYLENE FILM, REVERSE PRINTED AND LAMINATED TO A 0.35 MIL SOLID ALUMINUM FOIL CORE, AND THEN LAMINATED TO A 3.75 MIL CLEAR VIRGIN POLYETHYLENE FILM. TAPE SHALL BE PRINTED USING A DIAGONALLY STRIPED DESIGN FOR MAXIMUM VISIBILITY, AND MEET THE APWA COLOR-CODE STANDARD FOR IDENTIFICATION OF BURIED UTILITIES. DETECTABLE MARKING TAPE SHALL BE PRO-LINE SAFETY PRODUCTS OR APPROVED EQUAL AND MADE IN THE USA.
2. PIPELINE DETECTABLE WIRE SHALL BE INSTALLED CONTINUOUSLY ALONG PIPE. WIRE SHALL BE HDPE INSULATED (GREEN), COPPER OR COPPER CLAD STEEL CORE, #12 AWG AND RATED FOR DIRECT BURIAL. SPLICING SHALL BE DONE WITH WATER AND CORROSION PROOF CONNECTORS RATED FOR DIRECT BURIAL. WIRE TO BE BROUGHT UP TO THE SURFACE AT THE BEGINNING AND TERMINATION OF THE PIPE, ALL TRACER STATIONS AND AT ANY IN-LINE VALVING (INTERIOR OF THE VALVE BOX). CONTRACTOR MUST PERFORM ELECTRICAL TESTING FOR CONTINUITY BEFORE ACCEPTANCE. DIRECTION DRILLING APPLICATIONS SHALL USE COPPER CLAD STEEL CORE WIRE.

SS-FM-3 | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | FORCE MAIN TRENCH DETAIL | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-FM-3 | LAST REVISED: 2/24/2016

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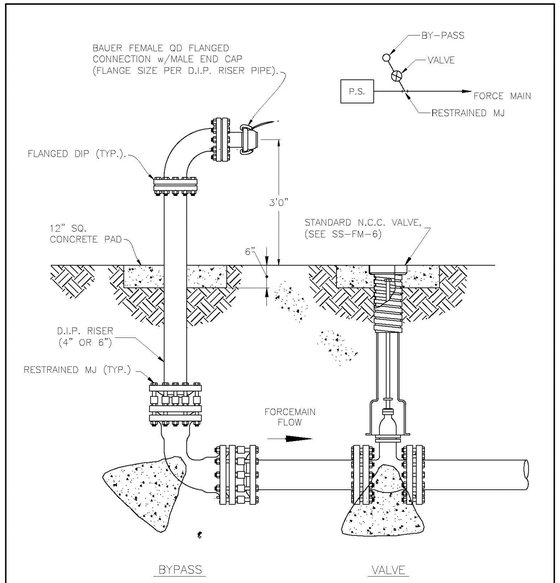

NOTE:
BYPASS TO BE PLACED NEAR PUMP STATION PER APPROVED PLANS.

(NOT TO SCALE)

SS-FM-4 | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | FORCE MAIN BYPASS CONNECTION | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-FM-4 | LAST REVISED: 12/14/2016

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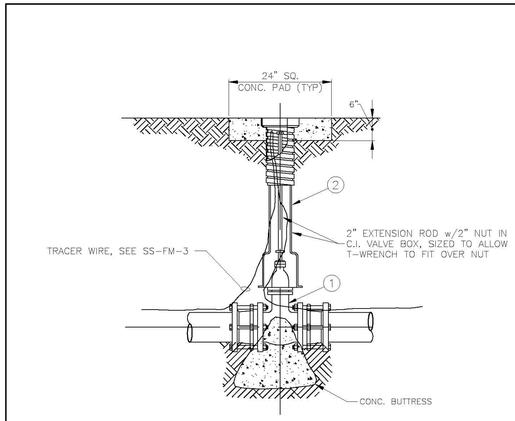

(NOT TO SCALE)

ITEM	DESCRIPTION
1.	RESILIENT WEDGE GATE VALVE, NRS, 2" SQUARE OPERATING NUT, MJ X MJ, SUITABLE FOR BURIED INSTALLATION.
2.	3-PIECE SCREW TYPE VALVE BOX, CAST IRON, LID MARKED "SEWER".

SS-FM-6 | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | BURIED VALVE FORCE MAIN SIZE 4"ø AND LARGER | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-FM-6 | LAST REVISED: 11/10/2014

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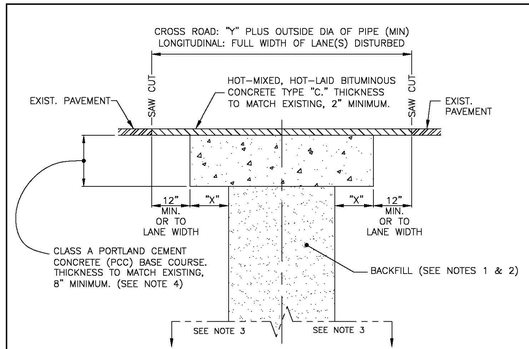

TYPICAL SECTION

NOTES:

1. FILL TRENCH WITH BORROW TYPE C "BACKFILL" IN COMPLIANCE WITH SECTION 20.03-2 OF THE NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION
2. "BACKFILL" TO BE COMPACTED IN 8" LIFTS TO 95% STANDARD PROCTOR DENSITY BY ASTM D698.
3. SEE DETAIL: NCC PLATE NO. SS-IN-2 FOR TRENCH WIDTH AND PIPE BEDDING REQUIREMENTS.
4. FOR EXISTING BITUMINOUS CONCRETE PAVEMENT, HOT-MIXED, HOT-LAID BITUMINOUS CONCRETE BASE COURSE (12" MINIMUM THICKNESS) MAY BE SUBSTITUTED FOR CLASS A PORTLAND CEMENT CONCRETE (PCC).

ROADWAY TABLE	DIMS	HOT-MIX	PCC
BASE COURSE WIDTH	X	12"	24"
WEAR COURSE WIDTH	Y	6'-0"	8'-0"

SS-IN-1 | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | PAVING RESTORATION DETAIL (NTS) | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-IN-1 | LAST REVISED: 5/10/2019

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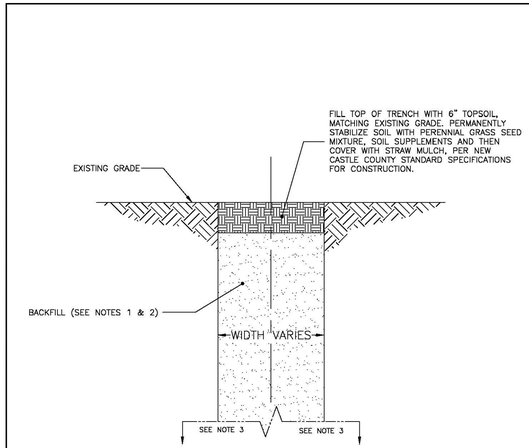

TYPICAL SECTION

NOTES:
1. FILL TRENCH WITH BORROW TYPE C "BACKFILL" IN COMPLIANCE WITH SECTION 20.03-2 OF NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. ALL "BACKFILL" TO BE COMPACTED USING MECHANICAL TAMPER OR VIBRATORY COMPACTOR IN 8" LIFTS.
3. FOR TYPICAL TRENCH WIDTH AND PIPE BEDDING, SEE DETAIL: NCC PLATE NO. SS-IN-2.
4. FOR NON-PAVED AREAS IN WHICH A TURF TRAIL IS PROPOSED, SEE DETAIL: NCC PLATE NO. SS-MISC-2.

SS-IN-1A | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | RESTORATION & TRENCH BACKFILL NON-PAVED AREA DETAIL (NTS) | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-IN-1A | LAST REVISED: 5/10/2019

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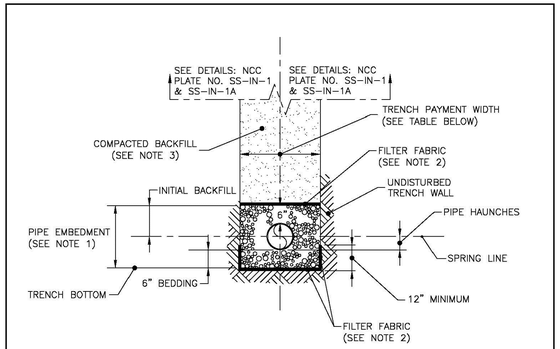

TYPICAL SECTION

NOTES:

1) PIPE EMBEDMENT: BEDDING, HAUNCHING AND INITIAL BACKFILL MATERIAL SHALL CONFORM TO SECTION 20.04-1, "STONE BEDDING," OF THE NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION.

1A) BEDDING: PRIOR TO PIPE INSTALLATION, CAREFULLY BRING STONE BEDDING UP TO PROPOSED BOTTOM OF PIPE TO BE INSTALLED AND ALONG ITS ENTIRE LENGTH. IF TRENCH BOTTOM IS IN UNSUITABLE MATERIAL, SUITABLE FILL MATERIAL WILL BE REQUIRED PRIOR TO PLACEMENT OF BEDDING.

1B) PIPE HAUNCHES: CAREFULLY WORK, BY HAND, STONE BEDDING FROM THE EDGE OF THE TRENCH UP AND UNDER THE PIPE TO SUPPORT THE HAUNCHES. CONTINUE FILLING, BY HAND, TO THE SPRING LINE OF THE PIPE.

2) MIRAFI 140N OR APPROVED EQUAL FILTER FABRIC.

3) FILL TRENCH WITH BORROW TYPE C "BACKFILL" IN COMPLIANCE WITH SECTION 20.03-2 OF THE NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION.

4) FOR NEW CASTLE COUNTY CAPITAL IMPROVEMENT PROJECTS, SEE TABLE FOR TRENCH PAYMENT WIDTH.

PIPE DIAMETER	TRENCH PAYMENT WIDTH
6"	36"
8"	36"
10"	36"
12"	36"
15" AND 16"	36"
18"	42"
20" AND 21"	42"
24"	48"
27"	60"
30"	60"

SS-IN-2 | NEW CASTLE COUNTY, DELAWARE | DEPARTMENT OF PUBLIC WORKS | TRENCH WIDTH AND PIPE BEDDING DETAIL (NTS) | THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION. | NCC PLATE NO. SS-IN-2 | LAST REVISED: 9/04/2019

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(717) 626-7271
elagroup.com

ANDREW T. PROSSER
LICENSE
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

FINAL DESIGN SET

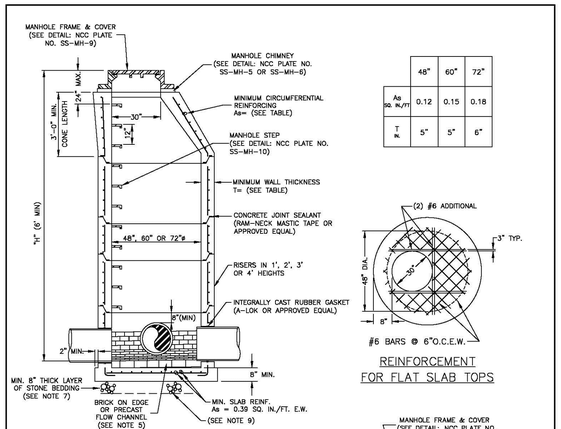
-

SUBJECT:
CONSTRUCTION DETAILS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
P-5

DRAWING: C:\Users\tmoberholtzen\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sanitary Sewer\DETAILS.dwg - PLOTTED: Apr 23, 2021 @ 1:24 am

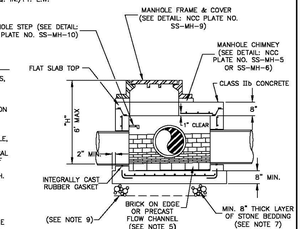


	48"	60"	72"
As SQ. IN./FT	0.12	0.15	0.18
T IN.	5"	5"	6"

TYPE A-2 MANHOLE
MIN 6' DEPTH

NOTES:

1. UNLESS OTHERWISE NOTED, MANHOLE CONICAL AND FLAT SLAB TOPS, RISERS AND BASE SECTIONS SHALL BE FURNISHED IN STRICT ACCORDANCE WITH ASTM DESIGNATION C478 (OR LATEST) FOR PRECAST REINFORCED CONCRETE MANHOLES. FLAT SLAB TOPS ARE PERMITTED FOR 72"ø, TYPE A-2 MANHOLES. INTERMEDIATE REDUCTION IN MANHOLE DIAMETER IS NOT PERMITTED.
2. ALL MANHOLES SHALL BE 4,000 PSI MIN. CONCRETE, TYPE II PORTLAND CEMENT.
3. REINFORCING FOR TYPE A-3 MANHOLE SAME AS TYPE A-2 MANHOLE, EXCEPT AS NOTED.
4. MANHOLE STEPS SHALL BE SPACED AS SHOWN IN A SINGLE VERTICAL ALIGNMENT. THE STEPS SHALL NOT BE STAGGERED. CENTERLINE OF STEP ORIENTATION TO BE ALIGNED OVER TOP OF BENCH AND NOT FLOW CHANNEL. BOTTOM STEP SHALL BE WITHIN 12" OF THE BENCH.
5. FLOW CHANNEL IN MANHOLE MAY BE BRICK ON EDGE OR PRECAST CONCRETE (4,000 PSI MIN.) NO CAST IN PLACE FLOW CHANNELS. SLOPE OF BENCH TO BE 1/4"/FT. MIN. TOWARD CHANNEL.
6. MANHOLE FLOW CHANNEL SHALL BE SLOPED IN THE DIRECTION OF FLOW BY 0.1" MINIMUM DROP.
7. STONE BEDDING SHALL CONFORM TO SPECIFICATION 20.04-1 OF THE NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION.
8. A MINIMUM BENCH WIDTH OF 18" IS REQUIRED EITHER SIDE OF THE MAIN FLOW CHANNEL.
9. IF MANHOLE BOTTOM IS IN UNSUITABLE MATERIAL, SUITABLE FILL MATERIAL AND MIRAFI 140N OR APPROVED EQUAL FILTER FABRIC WILL BE REQUIRED PRIOR TO PLACEMENT OF BEDDING.



TYPE A-3 MANHOLE
MAX 6' DEPTH

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	PRECAST CONCRETE MANHOLE DETAIL (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-MH-1 LAST REVISED: 5/10/2019

SS-MH-1

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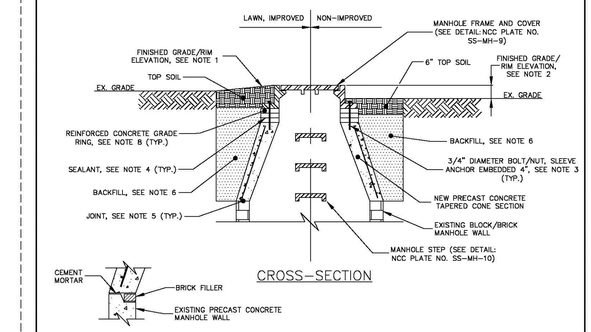

CROSS-SECTION

CROSS-SECTION OF JOINT AT PRECAST MANHOLE

NOTES:

1. IN LAWN OR IMPROVED AREAS WHERE NO RIM ELEVATION IS SPECIFIED, SET RIM 1" TO 2" ABOVE EXISTING GRADE ELEVATION AND TAPER TOP SOIL TO RIM.
2. IN NON-IMPROVED AREAS WHERE NO RIM ELEVATION IS SPECIFIED, AND NOT SUBJECT TO FLOODING, SET RIM 6" ABOVE EXISTING GRADE ELEVATION. RIM ELEVATION IN AREAS SUBJECT TO FLOODING SHALL BE DETERMINED BY ENGINEER.
3. FASTEN FRAME TO PRECAST TAPERED CONE SECTION USING A MINIMUM OF TWO BOLTS. BOLT HOLES SHALL BE CAST INTO GRADE RINGS. NO FIELD DRILLING OF HOLES.
4. SEAL EVERY JOINT IN MANHOLE 'CHIMNEY' BETWEEN THE FRAME AND GRADE RING, BETWEEN EACH GRADE RING AND BETWEEN GRADE RING AND TAPERED CONE SECTION USING ADHESIVE SEALANT CONFORMING TO ASTM D3498 AND SUITABLE FOR USE WITH MASONRY AND METAL MATERIALS. APPLY IN CONTINUOUS 1/2 INCH BEADS (MIN. TWO BEADS EVERY JOINT).
5. SEAL PRECAST CONE SECTION TO COMPETENT LAYER OF BLOCK OR BRICK USING CEMENT MORTAR. IF EXISTING MANHOLE IS PRE-CAST CONCRETE, SECURE BRICK IN GROOVED JOINT, WITH CEMENT MORTAR PRIOR TO PLACING CONE SECTION.
6. REPLACE ALL UNSUITABLE MATERIAL WITH SUITABLE FILL MATERIAL, COMPACTED IN ACCORDANCE WITH THE NEW CASTLE COUNTY STANDARD OR SUPPLEMENTAL SPECIFICATIONS.
7. ADJUSTMENT RISERS OF ANY TYPE (I.E. BRICK) MAY NOT BE USED AS A SUBSTITUTE FOR GRADE RINGS.
8. COMBINED HEIGHT OF GRADE RINGS NOT TO EXCEED 12" (SEE DETAIL: NCC PLATE NO. SS-MH-7).
9. TOP SOIL SHALL BE PERMANENTLY STABILIZED WITH PERENNIAL GRASS SEED MIXTURE, SOIL SUPPLEMENTS AND COVERED WITH MULCH, PER NEW CASTLE COUNTY STANDARD SPECIFICATIONS FOR CONSTRUCTION.

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	NON-PAVED AREA MANHOLE CONE SECTION DETAIL (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-MH-5 LAST REVISED: 8/07/19

SS-MH-5

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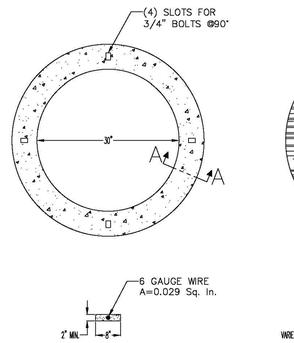
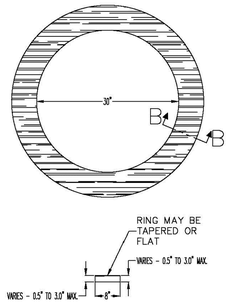


CROSS-SECTION A-A

REINFORCED CONCRETE GRADE RING



CROSS-SECTION B-B

RUBBER ADJUSTMENT GRADE RING

NOTES:

1. DESIGN MEETS REQUIREMENTS OF A.S.T.M. STANDARD C-478.
2. APPROXIMATE WEIGHT OF ONE REINFORCED CONCRETE GRADE RING:
   24"ø - 140 lbs.
   30"ø - 165 lbs.

NOTES:

1. SEAL EACH JOINT BETWEEN FRAME, RUBBER GRADE RING AND PRECAST GRADE RINGS USING ADHESIVE SEALANT CONFORMING TO ASTM D3498 AND SUITABLE FOR USE WITH MASONRY, RUBBER AND METAL MATERIALS. APPLY IN CONTINUOUS 1/2 INCH BEADS.
2. UNDER NO CIRCUMSTANCE SHALL A RUBBER GRADE RING BE MODIFIED OR ALTERED IN LIEU OF USING THE APPROPRIATE TAPERED GRADE RING.

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	GRADE RING DETAIL (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-MH-7 LAST REVISED: 5/10/2019

SS-MH-7

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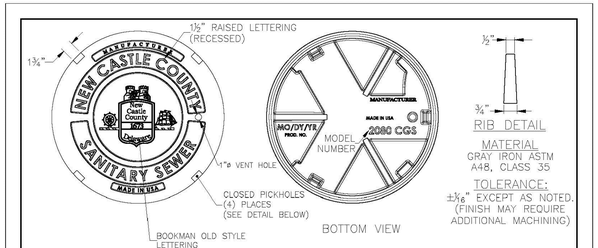
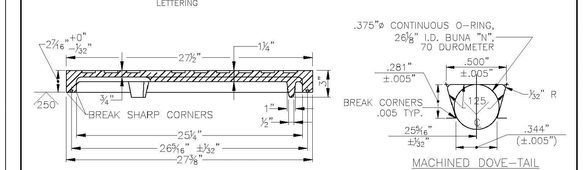
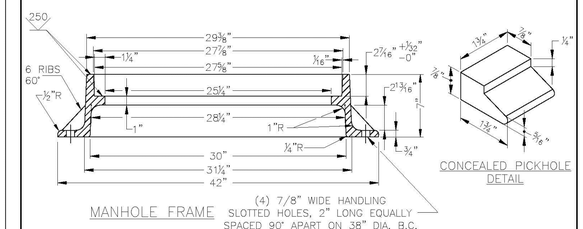




MANHOLE COVER

MACHINED DOVE-TAIL GROOVE FOR O-RING DETAIL



MANHOLE FRAME

(4) 7/8" WIDE HANDLING SLOTTED HOLES, 2" LONG EQUALLY SPACED 90° APART ON 38" DIA. B.C.

CONCEALED PICKHOLE DETAIL

NOTE: MANHOLE FRAME AND COVER SHALL BE BY EAST JORDAN IRON WORKS, NEENAH FOUNDRY OR APPROVED EQUAL.

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	SANITARY SEWER DETAILS SELF SEALING MANHOLE FRAME & COVER	ISSUED 5/27/10 REVISED 12/02/10 REVISED 12/6/12 PLATE SS-MH-9

SS-MH-9

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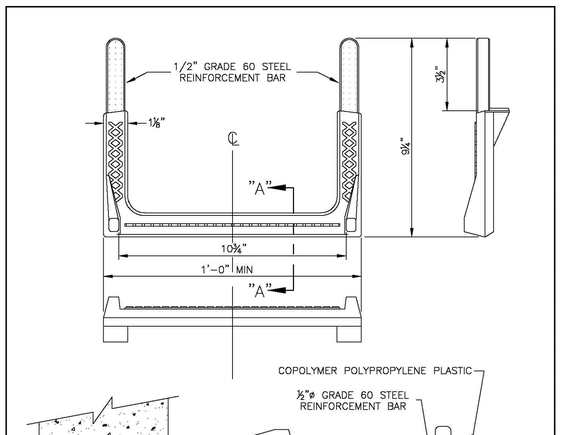

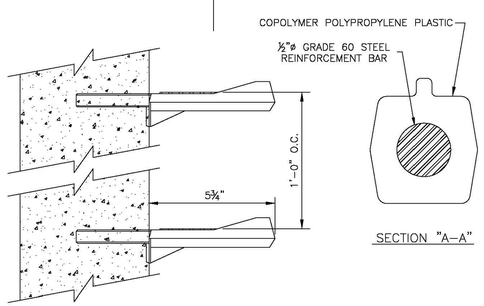

SECTION "A-A"

TYPICAL WALL SECTION

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	MANHOLE STEP DETAIL (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-MH-10 LAST REVISED: 5/10/2019

SS-MH-10

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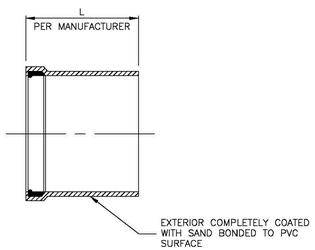

TYPICAL SECTION

SPECIFICATIONS:
MATERIAL: ASTM D1784-03
GASKET JOINT: ASTM D3212-96a(2003)e1
GASKET: ASTM F477-02e1
PIPE DIAMETER TO WALL THICKNESS: SDR-26

NOTES:

1. ONE PIECE MOLDED.
2. ADAPTERS AS MANUFACTURED BY HARCO OR APPROVED EQUAL.

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	MANHOLE ADAPTER (SAND COLLAR) FOR PVC OR DIP SEWER (SINGLE BELL) DETAIL (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-MH-11 LAST REVISED: 5/10/2019

SS-MH-11

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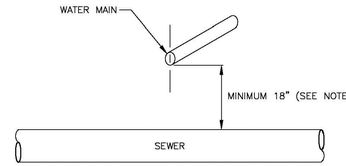

ELEVATION

WATER MAIN/SEWER CROSSING

NOTES:

WHERE THE VERTICAL SEPARATION BETWEEN A WATER MAIN AND SEWER (WHETHER WATER MAIN IS LOCATED ABOVE OR BELOW THE SEWER) IS 18" OR LESS:

1) SEWER SHALL BE DESIGNED AND CONSTRUCTED EQUAL TO WATER PIPE AND BE PRESSURE TESTED AT 150 p.s.i. TO ASSURE WATER TIGHTNESS, PRIOR TO BACKFILLING.
2) EITHER THE WATER MAIN OR SEWER MAY BE ENCASED IN A WATERTIGHT CARRIER PIPE WHICH EXTENDS 10 FEET ON BOTH SIDES OF THE CROSSING, AS MEASURED PERPENDICULAR TO THE WATER MAIN. THE CARRIER PIPE SHALL BE OF MATERIALS APPROVED BY NEW CASTLE COUNTY FOR USE IN WATER MAIN CONSTRUCTION.
3) THE JOINTS IN THE SEWER PIPELINE SHALL BE ARRANGED SUCH THAT THEY WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN CROSSING.
4) WHEN THE WATER MAIN CROSSES BELOW THE SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO MAINTAIN LINE AND GRADE.

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	WATER MAIN CROSSING DETAIL (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-MISC-4 LAST REVISED: 5/10/2019

SS-MISC-4

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No. 18486
DELAWARE
PROFESSIONAL ENGINEER

FINAL DESIGN SET

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SUBJECT:
CONSTRUCTION DETAILS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
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SCALE : NTS

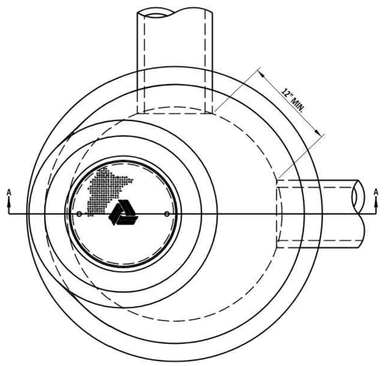
MINIMUM PRECAST ROUND MANHOLE REQUIREMENTS			
MANHOLE DIAMETER	MINIMUM WALL THICKNESS	CIRCUMFERENTIAL REINFORCEMENT* (PER VERTICAL FOOT)	BASE SLAB THICKNESS**
48"	4"	0.12 IN²	6"
60"	5"	0.15 IN²	8"
72"	6"	0.18 IN²	8"
84"	7"	0.21 IN²	8"

ADDITIONAL MINIMUM REQUIREMENTS:

* MINIMUM VERTICAL REINFORCEMENT: ASSEMBLE EACH LINE OF HORIZONTAL REINFORCEMENT INTO A CAGE CONTAINING SUFFICIENT VERTICAL BARS OR MEMBERS TO MAINTAIN THE REINFORCEMENT IN SHAPE AND POSITION WITHIN THE FORM.

** MINIMUM BASE SLAB REINFORCEMENT: PROVIDE A MINIMUM OF ONE LAYER IN EACH DIRECTION, LOCATED ABOVE THE MIDPOINT. PROVIDE MINIMUM AREA OF 0.12 SQ. IN. PER LINEAR FOOT IN EACH LAYER.

*** ADDITIONAL REINFORCEMENT AT OPENINGS: PLACE 8 ADDITIONAL #4 BARS (2 HORIZ., 2 VERT. 4 DIAGONAL) AROUND EACH OPENING IN MANHOLE RISER OR BASE SECTIONS. MAKE BAR LENGTH = OPENING SIZE + 6".



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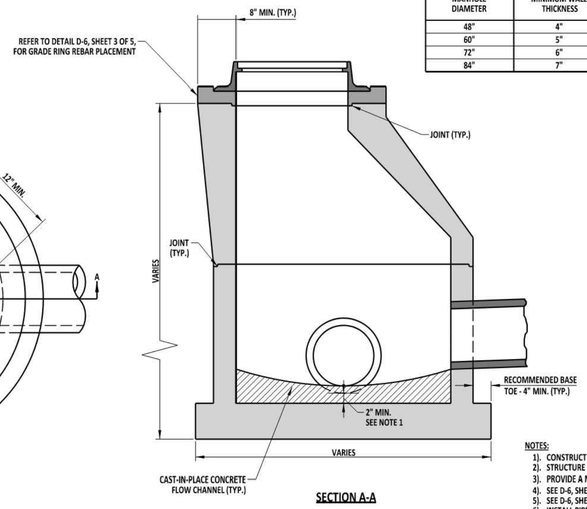


SECTION A-A

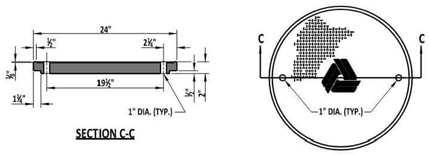
NOTES:
1). CONSTRUCT ROUND MANHOLES IN ACCORDANCE WITH AASHTO M 199.
2). STRUCTURE BASE TOE IS RECOMMENDED TO COUNTERACT BUOYANCY.
3). PROVIDE A MINIMUM COVER OF 1½" FOR ALL REINFORCEMENT.
4). SEE D-6, SHEET 3 OF 5, FOR GRADE RING DETAILS.
5). SEE D-6, SHEET 5 OF 5, FOR ROUND COVER SLAB DETAILS.
6). INSTALL PIPES FLUSH WITH MANHOLE WALL PER DELDOT STANDARD SPECIFICATIONS SECTION 602.3.
7). FABRICATOR IS RESPONSIBLE FOR LIFTING, HANDLING AND TRANSPORTATION STRESSES.
8). STEPS ARE REQUIRED FOR ALL MANHOLES 4'-0" DEPTH OR GREATER. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH AASHTO M 199.

ROUND MANHOLE ASSEMBLY

DelDOT					
	09/01/2020 ENGINEERING SUPPORT DATE	ROUND MANHOLE ASSEMBLY		REVIEWED	09/01/2020 TRAFFIC PRODUCTION - ENGINEER DATE
	RECOMMENDED	STANDARD NO. D-6 (2020)	SHT. 2 OF 5	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020

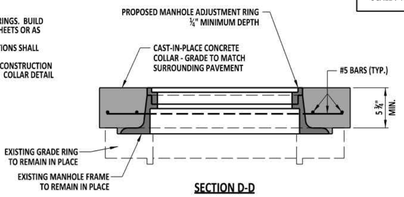
SCALE : NTS



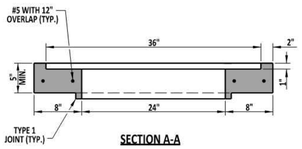
SECTION C-C

COVER

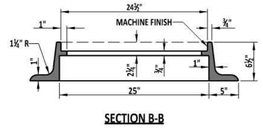
NOTES:
1). DETAILS SHOWN ARE FOR CAST-IN-PLACE GRADE RINGS. BUILD GRADE RINGS TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.
2). IF GRADE RINGS ARE PRECAST, DESIGN SPECIFICATIONS SHALL CONFORM TO AASHTO M-199, LATEST REVISIONS.
3). COLLAR DETAILS SHOWN ARE FOR CAST-IN-PLACE CONSTRUCTION AROUND MANHOLE ADJUSTMENTS AND REPAIRS. COLLAR DETAIL IS NOT INTENDED FOR NEW CONSTRUCTION
4). PROVIDE MINIMUM COVER OF 1½".



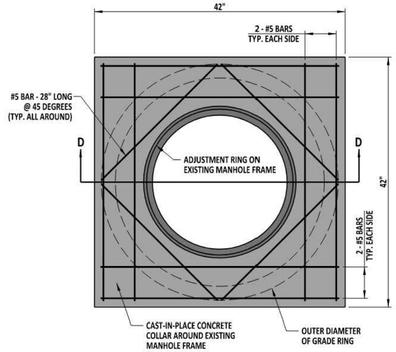
SECTION D-D



SECTION A-A

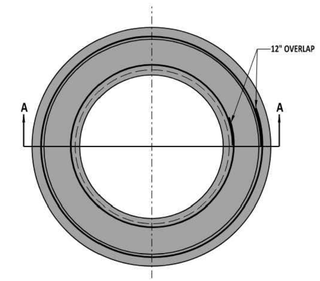


SECTION B-B

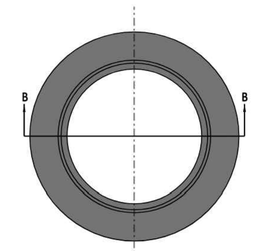


NOTES:
1). USE TOP UNIT WHERE BITUMINOUS PAVEMENT IS NOT AVAILABLE.
2). WHERE COLLAR EXTENDS BEYOND GRADE RING, PREPARE ADEQUATE SUB-BASE.

TOP UNIT



GRADE RING

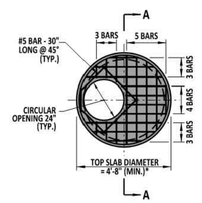


FRAME

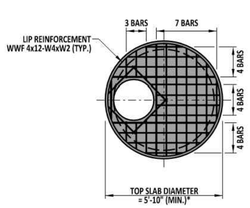
DelDOT					
	09/01/2020 ENGINEERING SUPPORT DATE	MANHOLE GRADE RING, TOP UNIT, FRAME AND COVER		REVIEWED	09/01/2020 TRAFFIC PRODUCTION - ENGINEER DATE
	RECOMMENDED	STANDARD NO. D-6 (2020)	SHT. 3 OF 5	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020

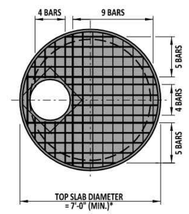
SCALE : NTS



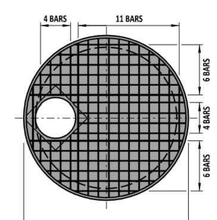
48" DIAMETER MANHOLE



60" DIAMETER MANHOLE

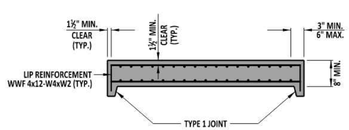


72" DIAMETER MANHOLE



84" DIAMETER MANHOLE

ROUND MANHOLE COVER SLAB DETAILS



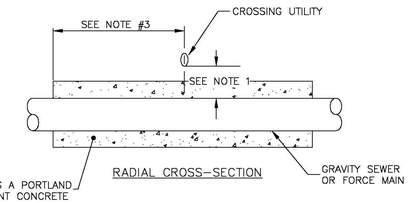
SECTION A-A
(ADDITIONAL REINFORCEMENT NOT SHOWN)

NOTES:
1). PRECAST COVER SLABS.
2). USE #5 BARS SPACED AT 6" UNLESS NOTED OTHERWISE.
3). PROVIDE A MINIMUM BAR COVER OF 1½".
4). COVER SLAB DESIGN SPECIFICATIONS SHALL MEET HL-93 LOADING AND CONFORM TO AASHTO M-199, LATEST REVISIONS.

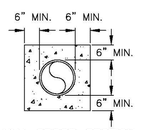
* DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF MANHOLE. SEE SHEET 3 OF 5 FOR MINIMUM WALL THICKNESS.

DelDOT					
	09/01/2020 ENGINEERING SUPPORT DATE	ROUND MANHOLE COVER SLAB		REVIEWED	09/01/2020 TRAFFIC PRODUCTION - ENGINEER DATE
	RECOMMENDED	STANDARD NO. D-6 (2020)	SHT. 5 OF 5	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020



RADIAL CROSS-SECTION



AXIAL CROSS-SECTION

NOTES:

1. WHEN CROSSING UTILITY IS STORM SEWER
   IF STORM SEWER IS LESS THAN 18"ø AND WHERE THE VERTICAL SEPARATION FROM EITHER A GRAVITY SEWER OR FORCE MAIN IS LESS THAN 2', CONCRETE SHALL FILL THE VOID BETWEEN THEM WHILE CRADLING THE STORM SEWER.

   IF STORM SEWER IS EQUAL TO OR GREATER THAN 18"ø AND WHERE THE VERTICAL SEPARATION FROM EITHER A GRAVITY SEWER OR FORCE MAIN IS LESS THAN 3', CONCRETE SHALL FILL VOID BETWEEN THEM WHILE CRADLING THE STORM SEWER.

   CROSSING UTILITY OTHER THAN STORM SEWER OR WATER MAIN:
   WHERE THE VERTICAL SEPARATION FROM EITHER A GRAVITY SEWER OR FORCE MAIN IS LESS THAN 12", CONCRETE SHALL FILL THE VOID BETWEEN THEM WHILE CRADLING THE CROSSING UTILITY.

   WHERE THE VERTICAL SEPARATION FROM EITHER A GRAVITY SEWER OR FORCE MAIN IS 12" OR GREATER, THE CROSSING UTILITY SHALL BE SUPPORTED WITH AASHTO #57 STONE OR EQUIVALENT.
2. WHEN CROSSING UTILITY IS A WATER MAIN, SEE NCC PLATE NO. SS-MISC-4.
3. CONCRETE ENCASEMENT SHALL SPAN A MINIMUM DISTANCE OF 10' TO EITHER SIDE OF CROSSING UTILITY.
4. ALL CONCRETE SHALL BE 4,000 P.S.I. MINIMUM.
5. THE VERTICAL SEPARATION SHALL NOT BE LESS THAN 6".

NEW CASTLE COUNTY, DELAWARE DEPARTMENT OF PUBLIC WORKS	CONCRETE ENCASEMENT DETAIL FOR UTILITY CROSSING (NTS) THIS DETAIL IS SUBJECT TO REVISION. VERIFY WITH NEW CASTLE COUNTY, DEPARTMENT OF PUBLIC WORKS, CORRECTNESS OF DETAIL PRIOR TO IMPLEMENTATION.	NCC PLATE NO. SS-UC-1 LAST REVISED: 5/10/2019	

SS-UC-1

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

EA group, inc.
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LITITZ, PA 17543
(717) 626-7271
elagroup.com

ANDREW T. PROSSER LICENSE No. 18486 DELAWARE PROFESSIONAL ENGINEER

FINAL DESIGN SET

-

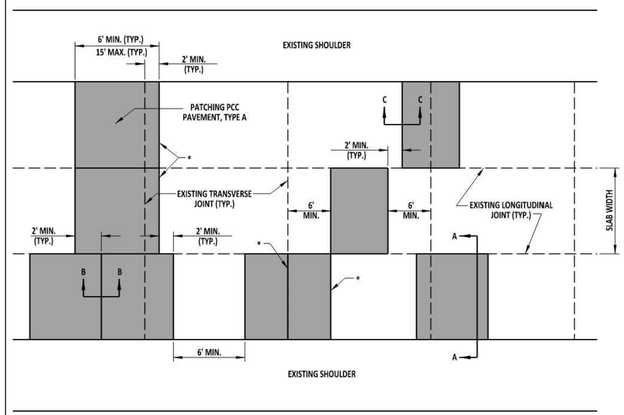
SUBJECT:
CONSTRUCTION DETAILS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
P-7

DRAWING: C:\Users\tmoberholtzer\BIM 360\ELA Group\1179-001 NVF Pump Station\Project Files\CAD Data\Sanitary Sewer\DETAILS.dwg - PLOTTED: Apr 23, 2021 @ 1:28 am

SCALE : NTS

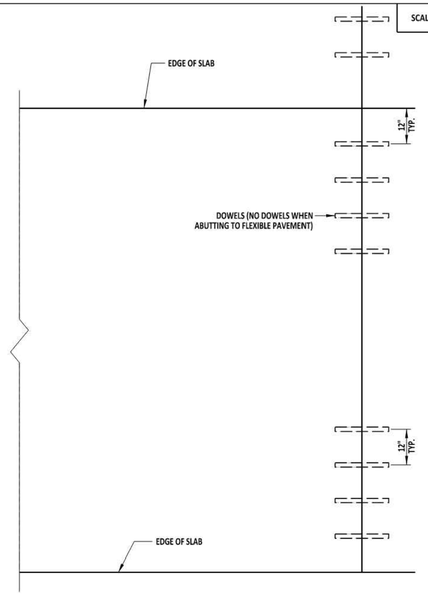


PLAN

* - EXACTLY MATCH PROPOSED LOCATIONS FOR TRANSVERSE JOINTS TO THE ALIGNMENT OF THE FINAL (EXISTING OR RELOCATED) TRANSVERSE JOINTS IN ALL IMMEDIATELY ADJACENT LANES.

NOTES:

1). WHEN REPAIRING EXISTING TRANSVERSE JOINTS, EXTEND THE PATCH A MINIMUM OF 24" THROUGH THE EXISTING JOINT, WHICH WILL RELOCATE THE JOINT.
2). WHEN NOT ALIGNED WITH THE FINAL EXPECTED TRANSVERSE JOINT LOCATIONS IN THE IMMEDIATELY ADJACENT LANES, OFFSET PROPOSED LOCATIONS FOR TRANSVERSE JOINTS A MINIMUM OF 2' FROM THE AFOREMENTIONED JOINTS.
3). MAKE THE LONGITUDINAL JOINT ALIGNMENT STRAIGHT AND CONTINUOUS THROUGH THE REPAIRED AREA.



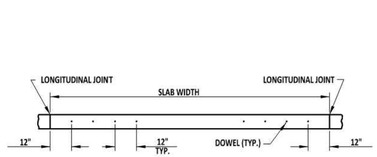
SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)

FULL DEPTH PATCH

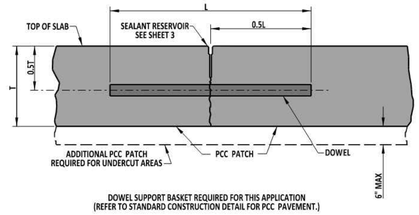
DelDOT	09/01/2020 ENGINEERING SUPPORT DATE	FULL DEPTH PATCH PLAN VIEWS		REVIEWED	09/01/2020 DEPUTY DIRECTOR - DOMICS DATE
	RECOMMENDED	STANDARD NO. P-2 (2020)	SHT. 1 OF 5	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020

SCALE : NTS



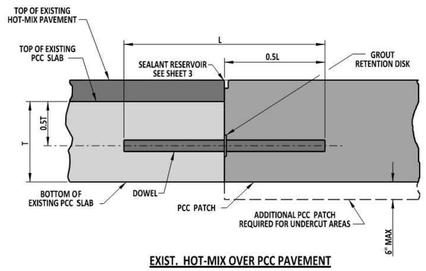
SECTION A-A



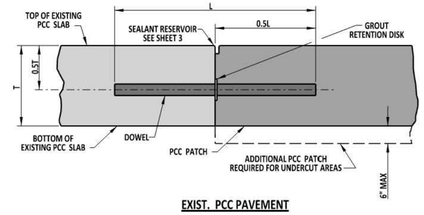
DOWEL SUPPORT BASKET REQUIRED FOR THIS APPLICATION (REFER TO STANDARD CONSTRUCTION DETAIL FOR PCC PAVEMENT.)

SECTION B-B

TRANSVERSE SAW-CUT USED FOR JOINTS LOCATED WITHIN THE PATCH



EXIST. HOT-MIX OVER PCC PAVEMENT



EXIST. PCC PAVEMENT

SECTION C-C

TRANSVERSE CONSTRUCTION JOINT USED ON JOINTS BETWEEN EXISTING PAVEMENT AND PATCH

FULL DEPTH PATCH

DelDOT	09/01/2020 ENGINEERING SUPPORT DATE	FULL DEPTH PATCH, SECTION VIEWS		REVIEWED	09/01/2020 DEPUTY DIRECTOR - DOMICS DATE
	RECOMMENDED	STANDARD NO. P-2 (2020)	SHT. 2 OF 5	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020

REVISIONS PER:	DATE:	BY:
1. -	-	-
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ANDREW T. PROSSER
LICENSE
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

FINAL DESIGN SET

-

SUBJECT:

CONSTRUCTION DETAILS

FOR

AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:

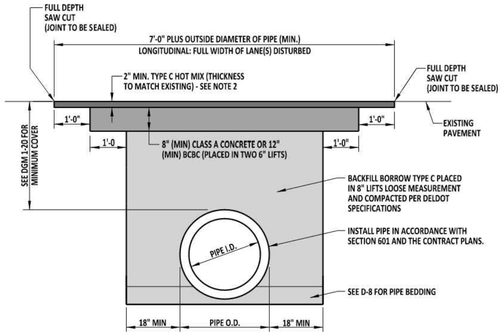
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

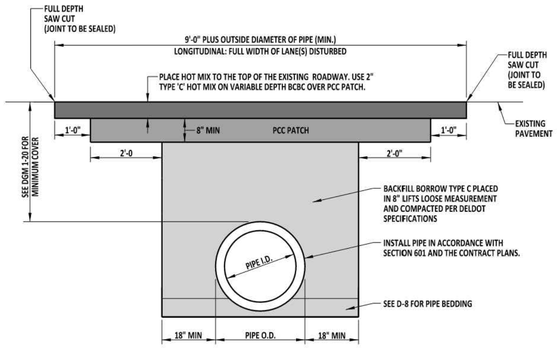
DRAWING NO.

P-8

SCALE : NTS



PERMANENT CROSS-ROAD OR LONGITUDINAL PATCH DETAIL



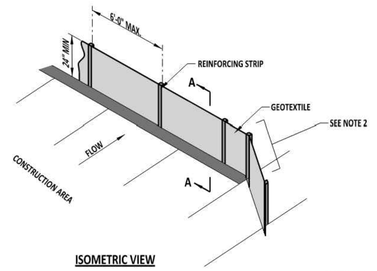
PERMANENT CROSS-ROAD OR LONGITUDINAL PATCH DETAIL
* EXISTING CONCRETE PAVEMENT OVERLAYED WITH HOTMIX LOCATIONS

NOTES:
1). PATCH WIDTHS ARE MEASURED ALONG THE ROADWAY CENTERLINE. CONSTRUCT PATCHES THE FULL WIDTH OF THE LANE OR LANES DISTURBED.
2). THIS IS A MINIMUM PATCH. IF THE EXISTING ROADWAY HAS A HEAVIER CROSS SECTION THAN SHOWN HERE, IT WILL BE REPLACED WITH THAT CROSS SECTION, OR AS DIRECTED BY THE ENGINEER.

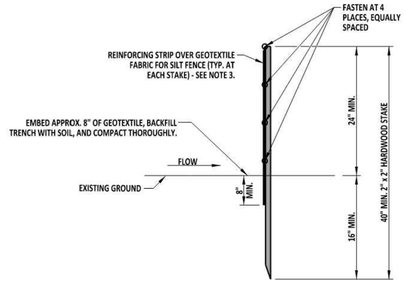
DelDOT	09/01/2020 ENGINEERING SUPPORT DATE	PERMANENT CROSS-ROAD PATCH OVER PIPE TRENCH	REVIEWED	09/01/2020 DEPUTY DIRECTOR - DOMUS IV DATE
	RECOMMENDED	STANDARD NO. P-4 (2020) SHT. 1 OF 1	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020

SCALE : NTS

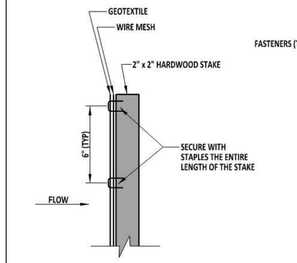


ISOMETRIC VIEW

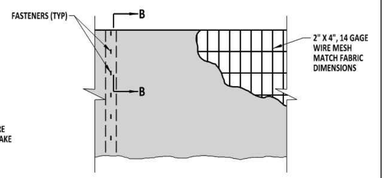


SECTION A-A

NOTES:
1). THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY AND IS NOT TO BE USED IN AREAS OF CONCENTRATED FLOW.
2). TURN ENDS OF SILT FENCE UPSLOPE TO CONTAIN RUNOFF.
3). REINFORCING STRIP IS TO BE ONE COMPLETE STRIP COVERING ALL GEOTEXTILE FABRIC AT POST.
4). FOR SILT FENCE CONSTRUCTION, JOIN TERMINAL ENDS AND ROLL ONE FULL REVOLUTION.

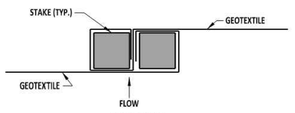


SECTION B-B

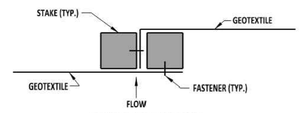


ELEVATION

WIRE MESH DETAIL
(REINFORCED SILT FENCE ONLY)



SILT FENCE CONNECTON DETAIL



REINFORCED SILT FENCE CONNECTON DETAIL

DelDOT	09/01/2020 ENGINEERING SUPPORT DATE	SILT FENCE	REVIEWED	09/01/2020 DEPUTY DIRECTOR - DOMUS IV DATE
	RECOMMENDED	STANDARD NO. E-2 (2020) SHT. 1 OF 2	APPROVED	09/01/2020 CHIEF ENGINEER DATE

08/20/2020

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
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5. -	-	-

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ENGINEERS + LANDSCAPE ARCHITECTS

ANDREW T. PROSSER
LICENSE
No. 18486
DELAWARE
PROFESSIONAL ENGINEER

FINAL DESIGN SET

-

SUBJECT:
CONSTRUCTION DETAILS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	ATP	DATE:	APRIL 2021
DESIGNER:	ATP	PROJECT NO.	1179-001
DRAWN BY:	TMO	SCALE:	NOT TO SCALE

DRAWING NO.
P-9

LEGEND AND ABBREVIATIONS

	EXISTING WIRING AND/OR EQUIPMENT TO REMAIN, OR PROVIDED BY OTHERS
DP-3	NEW WIRING AND/OR EQUIPMENT. ARROW INDICATES HOMERUN, LETTERS DENOTE CIRCUIT
	NEW WIRING RUN IN FLOOR CONSTRUCTION AND/OR UNDERGROUND
A / B	DRAWING/EQUIPMENT REFERENCE SYMBOL
A / B	SECTION/ELEVATION REFERENCE SYMBOL
B	WALL MOUNTED LIGHTING FIXTURE - UPPER CASE LETTER DENOTES FIXTURE TYPE IN LIGHTING FIXTURE SCHEDULE
A	LIGHTING FIXTURE: UPPER CASE LETTER DENOTES FIXTURE TYPE IN LIGHTING FIXTURE SCHEDULE
	WALL MOUNTED COMBINATION EXIT SIGN/EMERGENCY LIGHTING UNIT
S	SWITCH: SINGLE POLE
	CIRCUIT BREAKER
	DISCONNECT SWITCH : POLES & AMPACITY AS NOTED
	STARTER: SIZE & TYPE AS NOTED
	DUPLEX CONVENIENCE RECEPTACLE MOUNTED 18" A.F.F.-U.N.O.
	SINGLE SPECIAL PURPOSE RECEPTACLE WITH NEMA DESIGNATION
2	MOTOR AND MOTOR OUTLET: NUMBER DENOTES HORSEPOWER OR WATTS IF GREATER THAN 50
	TRANSFORMER
	SURFACE MTD. PANELBOARD & PANEL DESIGNATION
	FLUSH MTD. PANELBOARD & PANEL DESIGNATION
	SEAL-OFF FITTING
	GROUND
J J	JUNCTION BOX : SURFACE MOUNTED, FLUSH MOUNTED
	TERMINAL BLOCK

A	AMPERE
AC	ALTERNATING CURRENT
AIC	AMPERES INTERRUPTING CURRENT
ATS	AUTOMATIC TRANSFER SWITCH
BH	BLOCK HEATER
BC	BATTERY CHARGER
CKT	CIRCUIT
CTRL	CONTROL
CU	COPPER
DC	DIRECT CURRENT
DM	DIGITAL METER
EPO	EMERGENCY PUSHBUTTON OPERATOR - GENERATOR
FLT	BALL STYLE FLOAT
G/A	GENERATOR ANNUNCIATOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
LT	LEVEL TRANSDUCER
MCB	MAIN CIRCUIT BREAKER
MFGR	MANUFACTURER
MLO	MAIN LUG ONLY
MOD	MOTOR OPERATED DAMPER
MTD	MOUNTED
PRI	PRIMARY
PSI	POUNDS PER SQUARE INCH
REQD	REQUIRED
RTU	ROOFTOP UNIT
SEC	SECONDARY
SLD	SINGLE LINE DIAGRAM
SPD	SURGE PROTECTIVE DEVICE
TB	TERMINAL BLOCK
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLT
W/	WITH
W	WATT
XFMR	TRANSFORMER

SITE NOTES

(NOT REFERENCED ON DRAWING)

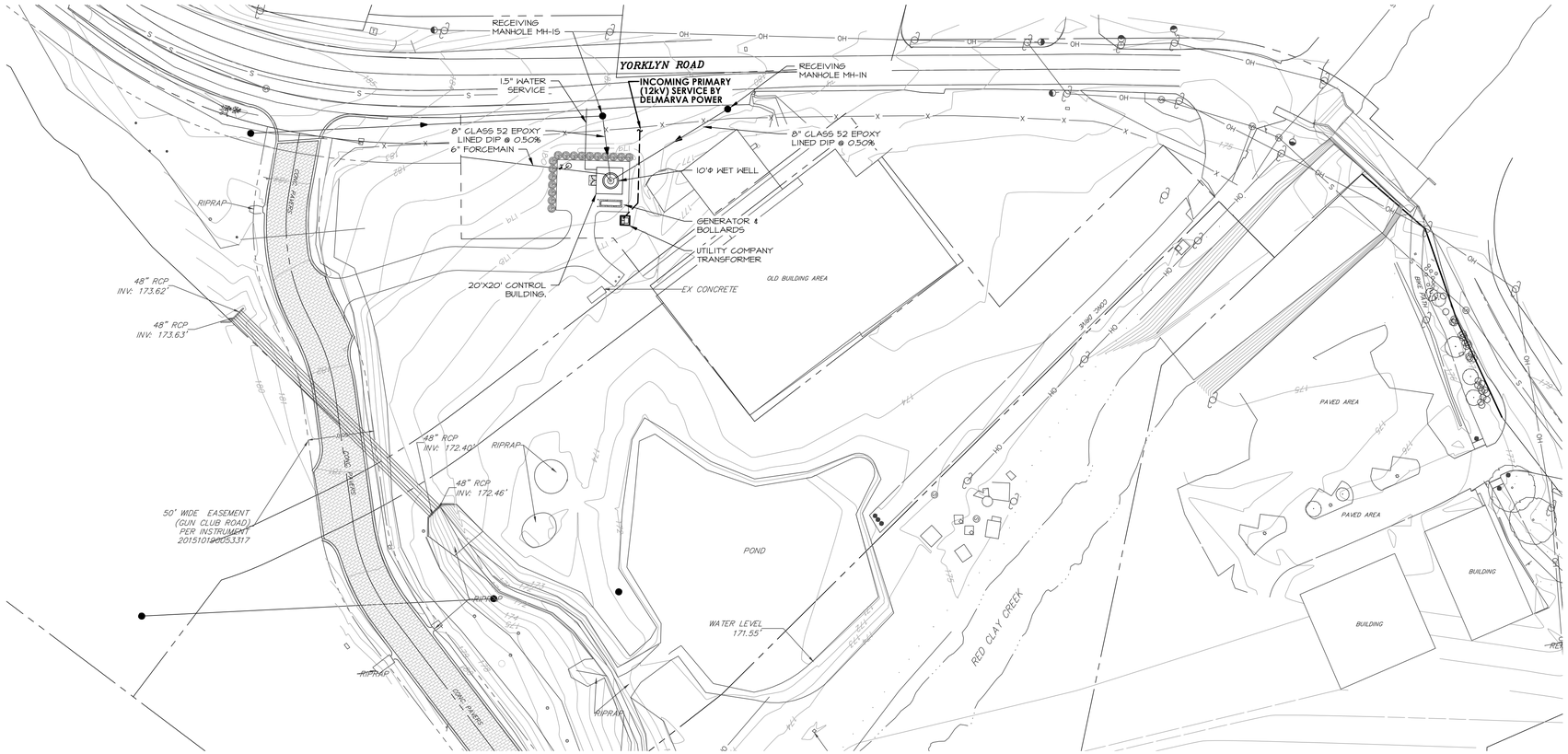
1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. CONTRACTOR SHALL OBTAIN THE SERVICES OF AN INDEPENDENT TESTING COMPANY, WHO SHALL BE RESPONSIBLE FOR THE IDENTIFICATION AND LOCATION OF ALL SITE UTILITIES IN THE AREA OF EXCAVATION OR DRILLING. NO ADDITIONAL COMPENSATION SHALL BE GIVEN FOR REPAIRS REQUIRED FOR DAMAGES TO EXISTING SITE UTILITIES.
3. CONTRACTOR SHALL IMMEDIATELY REPAIR, AT NO ADDITIONAL COST TO THE OWNER, ANY DAMAGE DURING EXCAVATION/ BACKFILLING, OR BORING TO EXISTING SITE UTILITIES.

ARC FLASH NOTES

1. EACH PANELBOARD, SWITCHBOARD, ENCLOSED CIRCUIT BREAKER & ELECTRICAL DISTRIBUTION APPARATUS SHALL BE PROVIDED WITH AN ARC FLASH LABEL INDICATING THE AVAILABLE ENERGY, SAFETY ZONE & EQUIPMENT PROTECTION REQUIRED. CONTRACTOR SHALL PREPARE AN ARC FLASH SAFETY STUDY, IN ADDITION TO THE COORDINATION & SHORT CIRCUIT STUDY AS PART OF THIS CONTRACT. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

SHORT CIRCUIT, COORDINATION & ARC FLASH NOTES

1. CONTRACTOR SHALL PROVIDE ALL FIELD INFORMATION INCLUDING BUT NOT LIMITED TO PANELBOARD DATA, FEEDER SIZE AND LENGTH & ALL OTHER RELATIVE INFORMATION TO THE ENGINEER PREPARING THE STUDY (UNDER THEIR CONTRACT) WHO WILL PERFORM THE SHORT CIRCUIT COORDINATION & ARC FLASH STUDY. ONCE STUDY IS COMPLETE, CONTRACTOR TO MAKE ALL FINAL CIRCUIT BREAKER ADJUSTMENTS TO MATCH THE STUDY & APPLY ALL ARC FLASH LABELS TO THE DISTRIBUTION EQUIPMENT.
2. CONTRACTOR SHALL VERIFY FEEDER SIZES THAT ARE SHOWN ON THE EXISTING FEEDER SCHEDULE AND PROVIDE THIS INFORMATION TO THE POWER SYSTEM STUDY ENGINEER.



1 E-1 OVERALL SITE PLAN

SCALE: 1" = 50'-0"

NORTH

SCALE IN FEET: 1" = 50'

0 25 50 100 150

REVISIONS PER:		DATE:	BY:
1.	-	-	-
2.	-	-	-
3.	-	-	-
4.	-	-	-
5.	-	-	-

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FINAL DESIGN SET

2	ISSUED FOR FINAL REVIEW 04-22-2021
1	ISSUED FOR 60% REVIEW 03-04-2021

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

e² ENGINEERING
106 West Commerce Street
Smyrna, DE 19977
Tel: 302-659-9090

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
801 W. Newport Pike, Wilmington, DE 19804
Tel: 302-999-1060, Fax: 302-999-1053
www.FaydaEES.com FE&ES COMM. NO: 21-1431

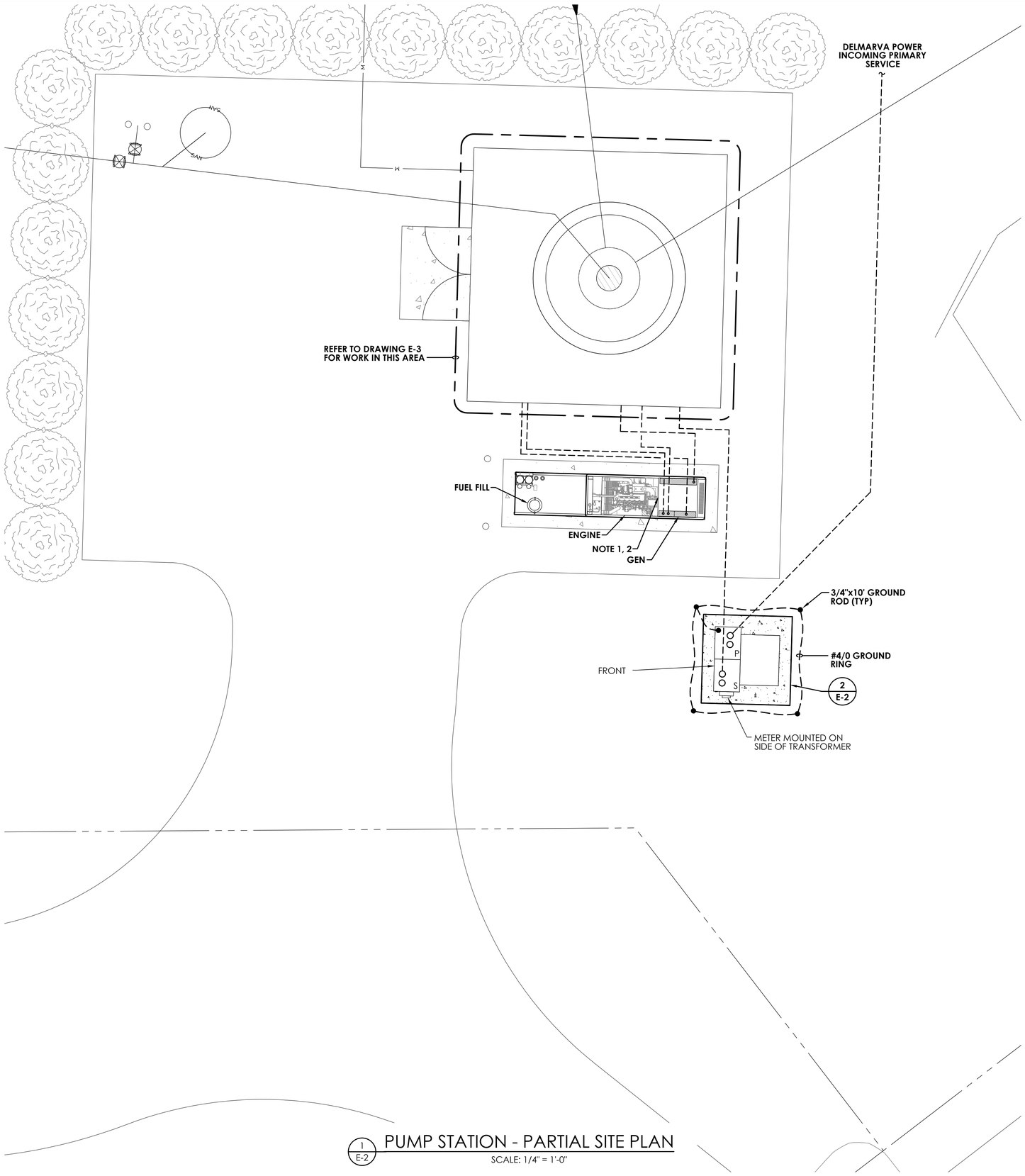
-

SUBJECT:
PUMP STATION SITE PLAN
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	EF	DATE:	APRIL 2021
DESIGNER:	EF	PROJECT NO.	1179-001
DRAWN BY:	MJG	SCALE:	AS NOTED

DRAWING NO.
E-1

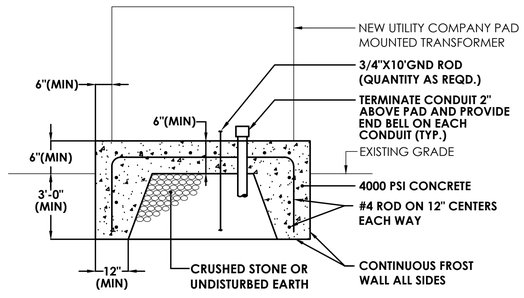


1 E-2 PUMP STATION - PARTIAL SITE PLAN

SCALE: 1/4" = 1'-0"

SHEET NOTES

1. PROVIDE SINGLE POLE SWITCH AND VAPORPROOF LIGHT FIXTURE WITH GUARD & GLOBE AND 100W EQUIVALENT SCREW-IN LED LAMP INSIDE GENERATOR ENCLOSURE.
2. PROVIDE GFCI RECEPTACLE INSIDE GENERATOR ENCLOSURE.



2 E-2 TRANSFORMER PAD DETAIL

NO SCALE

NORTH

SCALE IN FEET: 1/4" = 1'-0"

0 2' 4' 8' 12'

REVISIONS PER:		DATE:	BY:
1.	-	-	-
2.	-	-	-
3.	-	-	-
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743 S. BROAD ST.
LITITZ, PA 17543
(717) 626-7271
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FINAL DESIGN SET

-

SUBJECT:
PARTIAL SITE PLAN - POWER & SPECIAL SYSTEMS - NEW WORK
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	EF	DATE:	APRIL 2021
DESIGNER:	EF	PROJECT NO.	1179-001
DRAWN BY:	MJG	SCALE:	AS NOTED

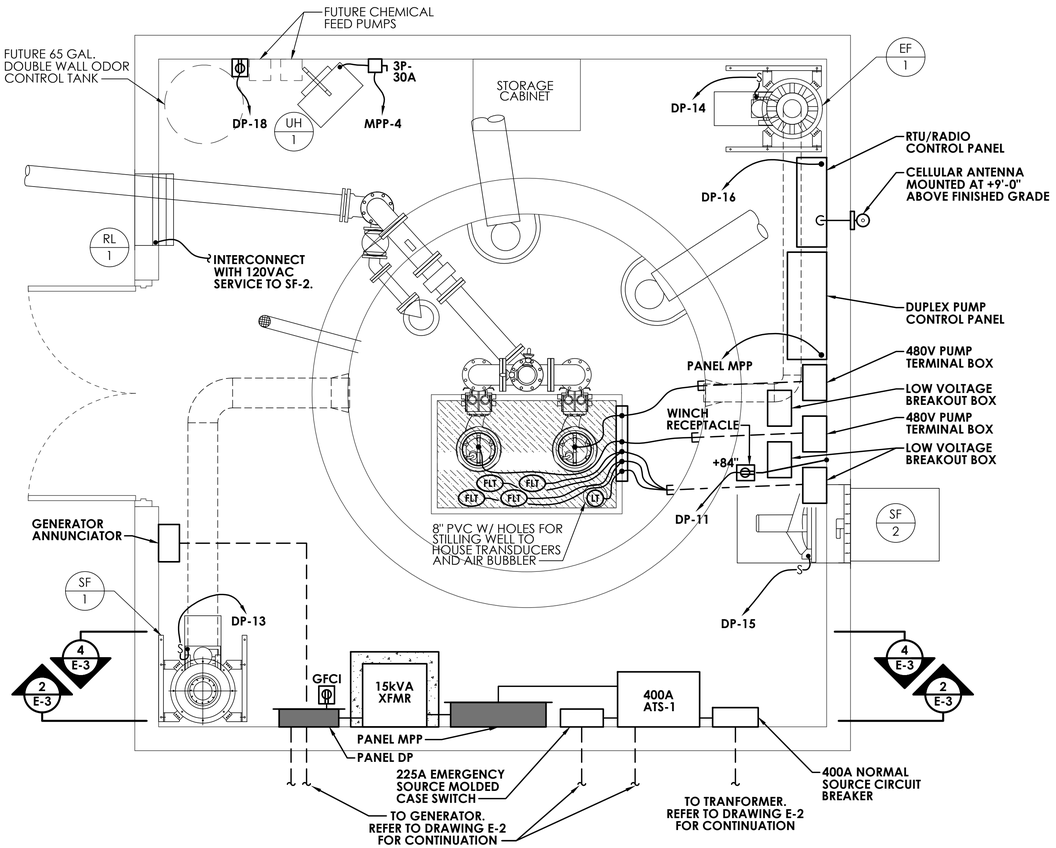
DRAWING NO.
E-2

2	ISSUED FOR FINAL REVIEW	04-22-2021
1	ISSUED FOR 60% REVIEW	03-04-2021

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

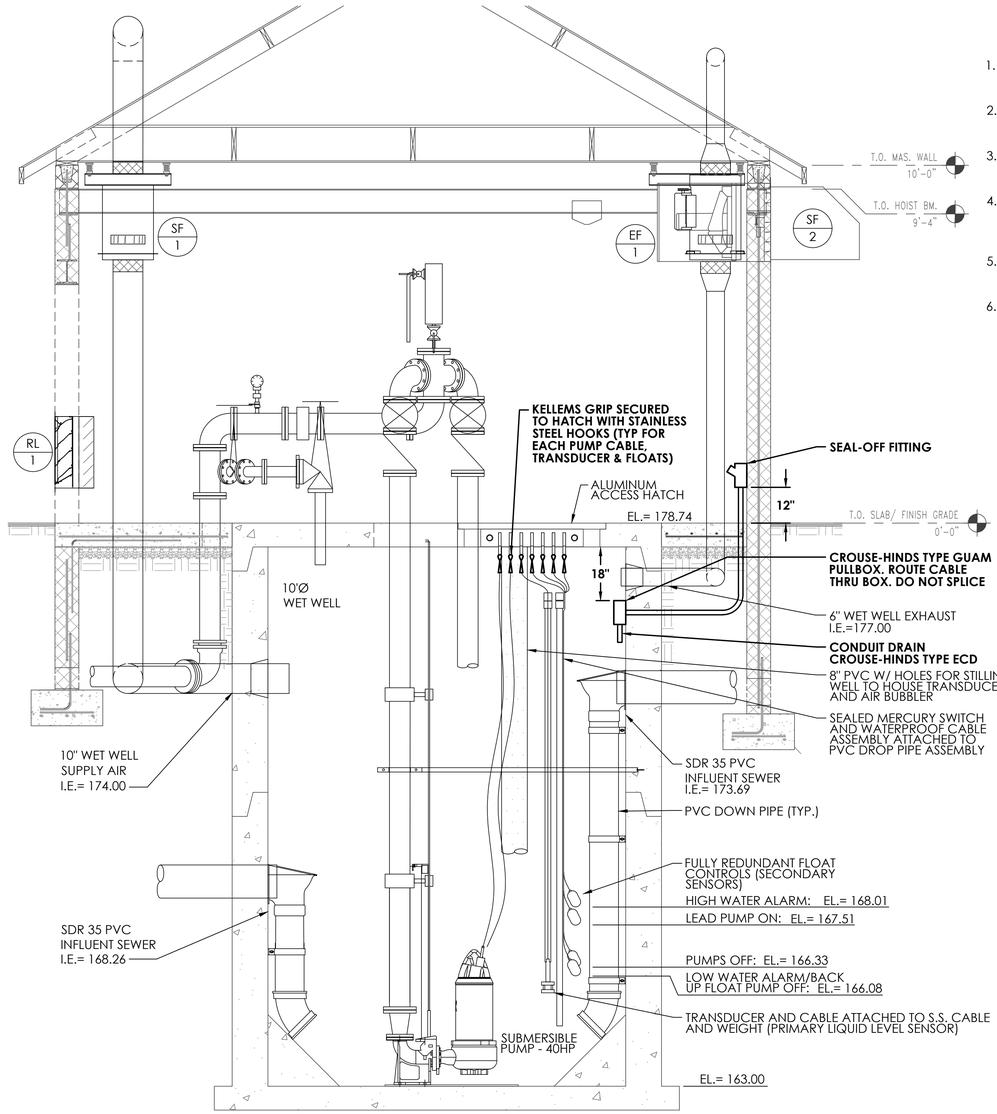
e² ENGINEERING
106 West Commerce Street
Smyrna, DE 19977
Tel: 302-659-9090

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
801 W. Newport Pike, Wilmington, DE 19804
Tel: 302-999-1060, Fax: 302-999-1053
www.FaydaEES.com FE&ES COMM. NO: 21-1431



1 E-3 CONTROL BUILDING FLOOR PLAN - POWER & SPECIAL SYSTEMS

SCALE: 1/2" = 1'-0"



2 E-3 WET WELL - SECTION VIEW

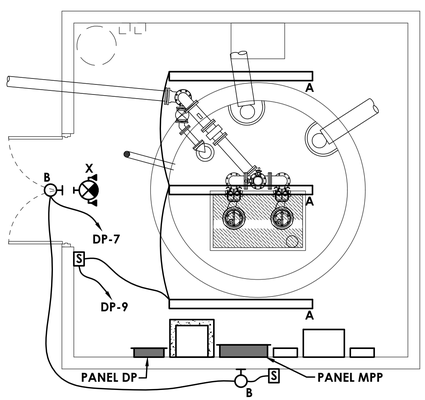
SCALE: 1/2" = 1'-0"

GENERAL NOTES

(NOT REFERENCED ON DRAWING)

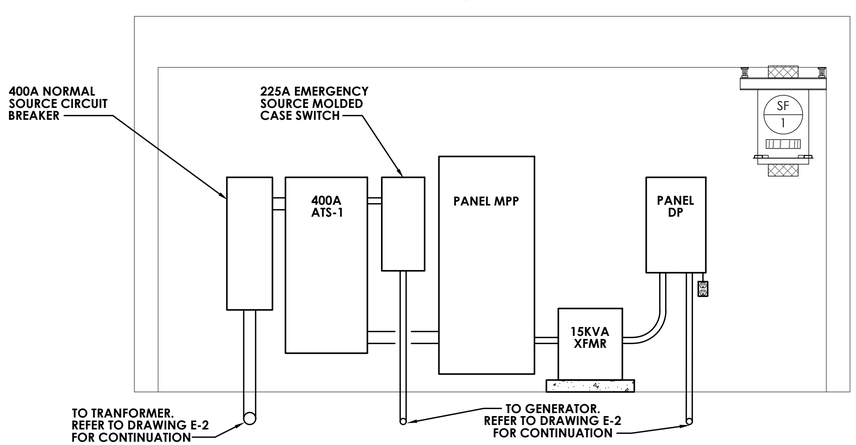
1. CONNECT EMERGENCY/EXIT FIXTURE TO UNSWITCHED SIDE OF INTERIOR LIGHTING CIRCUIT.
2. ALL CONDUITS FROM BUILDING DOWN TO WET WELL SHALL BE COLOR CODED ORANGE.
3. ALL CONDUITS LEAVING THE WET WELL SHALL BE PROVIDED WITH UL LISTED SEAL-OFF FITTINGS.
4. CONDUIT & ELECTRICAL FITTINGS SHOWN 90 DEGREES OUT OF POSITION FOR CLARITY. NOT ALL CONDUITS REQUIRED ARE SHOWN.
5. REFER TO MECHANICAL DRAWINGS FOR COORDINATION OF WET WELL FAN WIRING.
6. REFER TO MECHANICL DRAWINGS FOR COORDINATION OF MOTOR OPERATED DAMPERS.

NOTE: WET WELL SECTION VIEW, PROCESS EQUIPMENT AND ASSOCIATED PIPING IS SHOWN ROTATED 90 DEGREES FROM THE MECHANICAL, ELECTRICAL & STRUCTURAL SECTION VIEWS FOR CLARITY. IF CONTRACTOR HAS ANY QUESTIONS OR CLARIFICATIONS RELATED TO THE SECTION VIEWS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT A REQUEST FOR INFORMATION TO THE ENGINEER.



3 E-3 CONTROL BUILDING FLOOR PLAN - LIGHTING - NEW WORK

SCALE: 1/4" = 1'-0"



4 E-3 CONTROL BUILDING ELEVATION

SCALE: 1/2" = 1'-0"

REVISIONS PER:		DATE:	BY:
1.	-	-	-
2.	-	-	-
3.	-	-	-
4.	-	-	-
5.	-	-	-

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LITITZ, PA 17543
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FINAL DESIGN SET

-

SUBJECT:
CONTROL BUILDING FLOOR PLAN
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	EF	DATE:	APRIL 2021
DESIGNER:	EF	PROJECT NO.	1179-001
DRAWN BY:	MJG	SCALE:	AS NOTED

DRAWING NO.
E-3

2	ISSUED FOR FINAL REVIEW	04-22-2021
1	ISSUED FOR 60% REVIEW	03-04-2021

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

e2 ENGINEERING
106 West Commerce Street
Smyrna, DE 19977
Tel: 302-659-9090

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
801 W. Newport Pike, Wilmington, DE 19804
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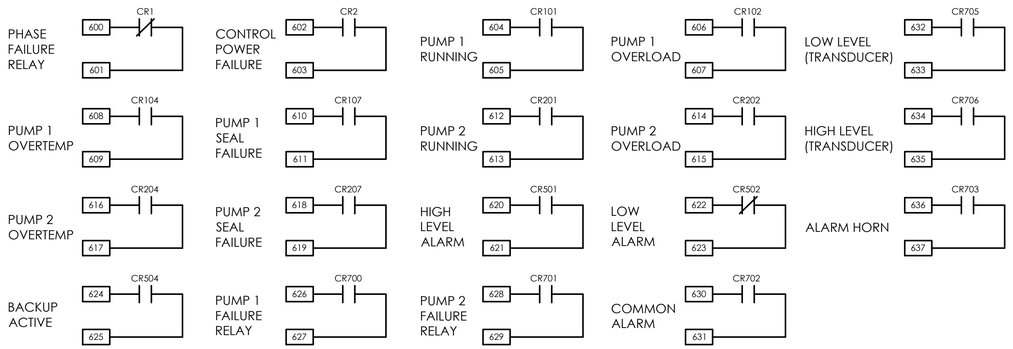
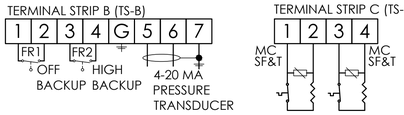
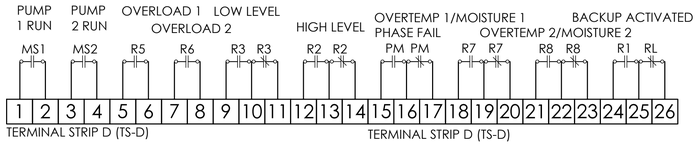


LAST WIRE #84

INTRINSICALLY SAFE WIRING TERMINALS
INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE



DRY CONTACTS LEAVING PANEL POWERED BY OTHERS SOURCE
REMOTE ALARMS



SCHEDULE FOR DIST. PANEL: MPP

STANDARD OF DESIGN: SQUARE D I-LINE

DESCRIPTION: TYPE HCM WITH HINGED COVER; PM-8244 DIGITAL METER; LOCATED IN: CONTROL ROOM

GENERAL PANEL SPECIFICATIONS:
BUS: [X] COPPER [ ] ALUMINUM
INCOMING CABLE: [X] COPPER [ ] ALUMINUM
[ ] MOLDED CASE SWITCH
[X] MAIN LUGS ONLY
400 AMPS MAIN LUG ONLY
18 KAIC
480Y/277VAC VOLTS 3 PHASE
MTG. SPACE INCHES: 54
4 WIRE

Schedule Number	LOAD SERVED TYPE OF LOAD	KVA	Ø	VOLTS	CIRCUIT PROTECTOR QUAN.	AMPS.	POLES	FRAME	WIRING DATA
1	SPD	.1	3	480/277	1	60	3	-	INTEGRAL
2	PUMP CONTROL PANEL	-	3	480	1	200	3	-	SEE SLD
3	15kVA TRANSFORMER	15	3	480	1	30	3	-	SEE SLD
4	UNIT HEATER	10	3	480	1	30	3	-	SEE SLD

SCHEDULE FOR DISTRIBUTION PANEL: DP (NEW)

LOCATED IN: CONTROL ROOM

GENERAL PANEL DATA:
208Y/120VAC, 3Phase, 4Wire
100A - MAIN LUG ONLY
30 CIRCUIT 10KAIC
SURFACE MOUNTED

CKT. No.:	LOAD SERVED TYPE OF LOAD	KVA PHASE A	KVA PHASE B	KVA PHASE C	CIRCUIT PROTECTOR VOLTS	CIRCUIT PROTECTOR CKT BRKR.	WIRING DATA
1	BACKFED MAIN BREAKER	-			208/120	3P-50A	SEE SLD
3			-				
5				-			
7	EXTERIOR LIGHTING	.1			120	1P-20A	SEE SLD
9	INTERIOR LIGHTING		.1		120	1P-20A	SEE SLD
11	ELECTRIC HOIST			1.2	120	1P-20A	SEE SLD
13	WET WELL SUPPLY FAN #1	.7			120	1P-20A	SEE SLD
15	SUPPLY FAN #2		.7		120	1P-20A	SEE SLD
17	RECEPTACLE (@ PANEL DP)			.18	120	1P-20A	SEE SLD
19	SPARE	-			120	1P-20A	-
21	SPARE		-		120	1P-20A	-
23	SPACE			-	-	-	-
25	SPACE	-			-	-	-
27	SPACE		-		-	-	-
29	SPACE			-	-	-	-
	TOTAL KVA A PHASE	0.8					2.1
	TOTAL KVA B PHASE		0.8				1.9
	TOTAL KVA C PHASE			1.38			3.18
	TOTAL PANEL KVA						7.18
	TOTAL PANEL AMPS AT 208V						20.0

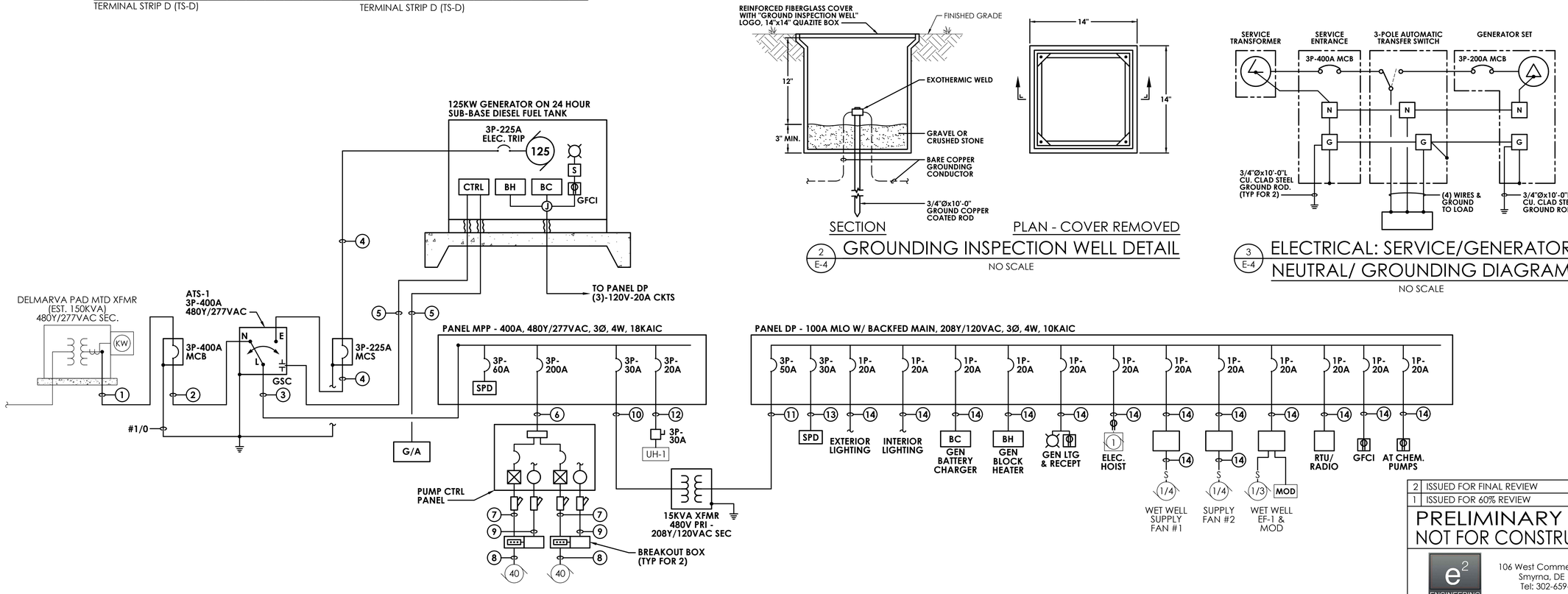
WIRING DATA	CIRCUIT PROTECTOR CKT BRKR.	CIRCUIT PROTECTOR VOLTS	KVA PHASE A	KVA PHASE B	KVA PHASE C	LOAD SERVED TYPE OF LOAD	CKT. No.:
SEE SLD	3P-30A	208/120	.1			SPD	2
				.1			4
					.1		6
SEE SLD	1P-20A	120	.5			GEN BATTERY CHARGER	8
SEE SLD	1P-20A	120		.5		GEN BLOCK HEATER	10
SEE SLD	1P-20A	120			.2	GEN LIGHTING & RECEPT.	12
SEE SLD	1P-20A	120	.7			WET WELL EXHAUST FAN #1	14
SEE SLD	1P-20A	120		.5		RTU/RADIO	16
SEE SLD	1P-20A	120			1.5	RECEPT.: CHEMICAL PUMPS	18
-	1P-20A	120	-			SPARE	20
-	1P-20A	120		-		SPARE	22
-	-	-			-	SPACE	24
-	-	-	-			SPACE	26
-	-	-		-		SPACE	28
-	-	-			-	SPACE	30
			1.3			TOTAL KVA A PHASE	
				1.1		TOTAL KVA B PHASE	
					1.8	TOTAL KVA C PHASE	

LIGHTING FIXTURE SCHEDULE

TYPE	MANUF.	CATALOG NUMBER	LAMP / DRVR	LAMP DATA CRI	TEMP	WATT	LUMENS	FIXTURE TYPE LED	DIMMABLE	MOUNTING	REMARKS
A	COLUMBIA	LCL-8-35-LW-E-U CSHC-LCLWG4	1 / 1	80+	3.5K	38	5152	X	-	CEILING/ CHAIN	8' LED LENSED STRIPLIGHT W/ CHAIN HANGER ASSEMBLY & WIREGUARD
B	HUBBELL	LNC-9L-4K-070-2-U-PCU	1 / 1	80	4K	21	2,072	X	-	WALL/ SURFACE	LED WALLPACK, BRONZE FINISH
X	DUAL-LITE	HCX-U-R-B-03L	- / -	-	-	6	-	X	-	WALL/ SURFACE	EMERGENCY BATTERY UNIT 2 LAMPS

FEEDER SCHEDULE

1	(4)-#500KCMIL - 4"C & (1)-4"C SPARE
2	(4)-#500KCMIL & (1)-#1/0GND - 4"C
3	(4)-#500KCMIL & (1)-#3GND - 4"C
4	(4)-#4/0 & (1)-#4GND - 2-1/2"C
5	1"C - WIRING PER GENERATOR MFGR
6	(3)-#3/0 & (1)-#6GND - 2"C
7	(3)-#1 & (1)-#8GND - 1-1/2"C
8	2"C - CABLE BY PUMP MFGR
9	3/4"C - INTRINSICALLY SAFE WIRING PER CONTROLLER MFGR
10	(3)-#10 & (1)-#10GND - 3/4"C
11	(4)-#6 & (1)-#10GND - 1"C
12	(3)-#12 & (1)-#12GND - 3/4"C
13	3/4"C - WIRING BY SPD MFGR
14	(2)-#12 & (1)-#12GND - 3/4"C



1 E-4 SINGLE LINE DIAGRAM
NO SCALE

2 E-4 GROUNDING INSPECTION WELL DETAIL
NO SCALE

3 E-4 ELECTRICAL: SERVICE/GENERATOR NEUTRAL/ GROUNDING DIAGRAM
NO SCALE

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
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LITITZ, PA 17543
(717) 626-7271
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FINAL DESIGN SET

-
SUBJECT:
SINGLE LINE DIAGRAM, SCHEDULES & DETAILS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

2	ISSUED FOR FINAL REVIEW		04-22-2021
1	ISSUED FOR 60% REVIEW		03-04-2021

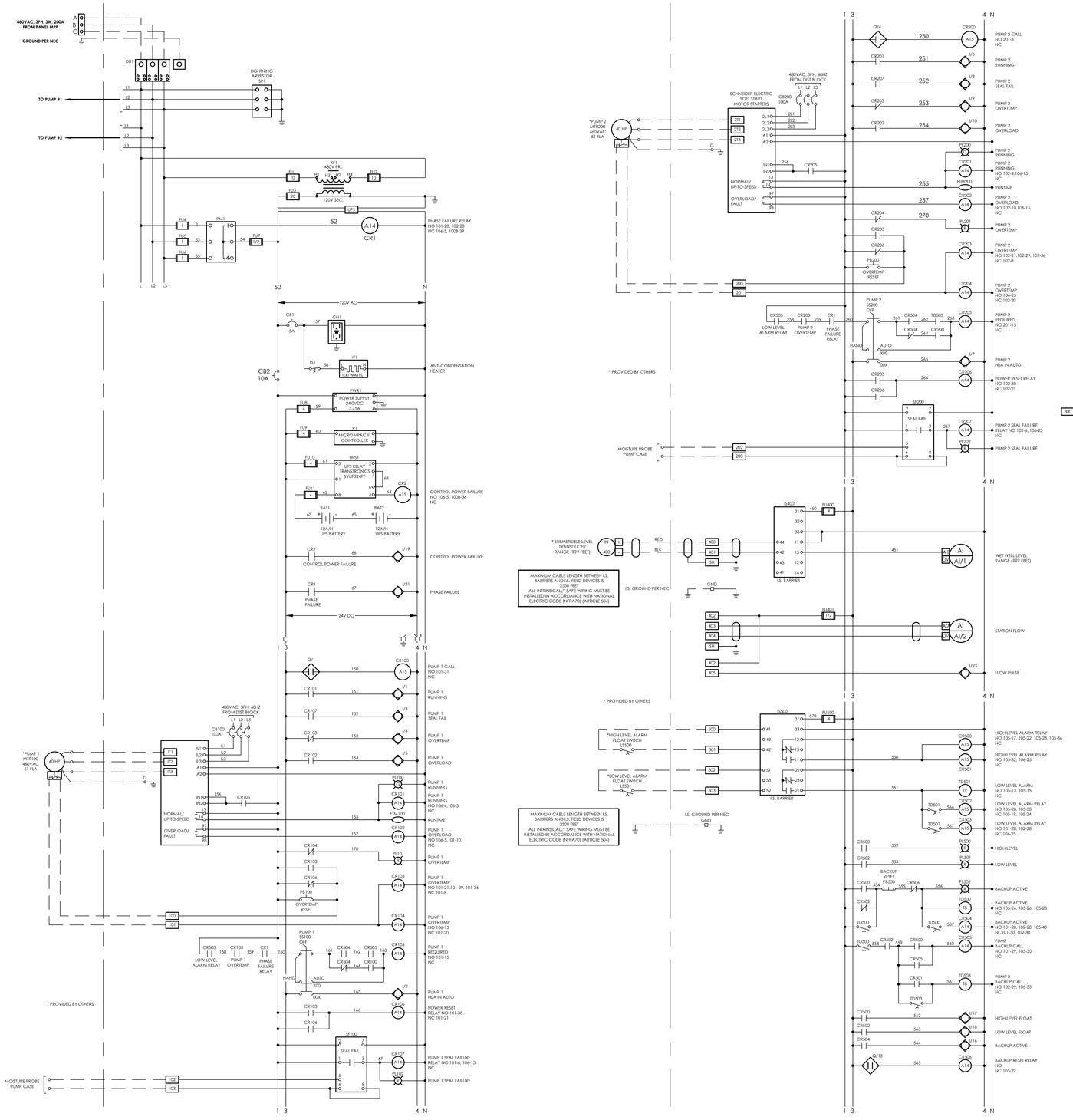
PRELIMINARY PLAN
NOT FOR CONSTRUCTION

e2 ENGINEERING
106 West Commerce Street
Smyrna, DE 19977
Tel: 302-659-9090

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
801 W. Newport Pike, Wilmington, DE 19804
Tel: 302-999-1060, Fax: 302-999-1053
www.FaydaEES.com FE&ES COMM. NO: 21-1431

MANAGER:	EF	DATE:	APRIL 2021
DESIGNER:	EF	PROJECT NO.	1179-001
DRAWN BY:	MJG	SCALE:	AS NOTED

DRAWING NO.
E-4



CONDUCTORS

- CONDUCTOR
- CONDUCTORS NOT CONNECTED
- CONDUCTORS CONNECTED
- CONDUCTOR SHIELD
- FIELD CONDUCTOR
- EARTH GROUND
- CHASSIS GROUND
- SHIELD GROUND (ISOLATED IF REQUIRED BY SPEC.)

TERMINALS

- #### — TERMINAL BLOCK FOR FIELD TERMINATION
- #### — TERMINAL BLOCK FOR INTERNAL USE ONLY TERMINATION
- #### — DEVICE TERMINATION POINT

RELAY COILS

- CR1 / XX — DEVICE ID: CONTROL RELAY; NO; NC; TYPE CODE (INTERNAL USE ONLY)
- M1 — MOTOR STARTER; NO; NC
- TD1 / XX / SET @ XXSEC. — ELECTRIC TIMER WITH ADJUSTABLE TIMING RANGE; NO; NC
- SOL1 — SOLENOID
- OL1 — THERMAL OVERLOAD

SWITCHES

- DESC1 DESC2 PB1 — DESCRIPTION TEXT (EXAMPLE: LAMP TEST); MORMALLY OPEN PUSHBUTTON
- DESC1 DESC2 PB2 — NORMALLY CLOSED PUSHBUTTON
- DESC1 DESC2 PB3 — NORMALLY CLOSED MUSHROOM HEAD E-STOP
- MECHANICAL CONNECTION
- DESC1 DESC2 SS1 POS1 POS2 0X — TWO POSITION SELECTOR SWITCH SHOWN IN 'POS1'; CONTACT MADE IN 'POS2'
- DESC1 DESC2 SS2 POS1 POS2 POS3 X00 00X — THREE POSITION SELECTOR SWITCH SHOWN IN 'POS1' POSITION; ARROW INDICATES SPRING RETURN FROM 'POS3'; CONTACT MADE IN 'POS3'
- DESC1 DESC2 SS3 POS1 POS2 POS3 POS4 X000 000X — FOUR POSITION SELECTOR SWITCH SHOWN IN 'POS1' POSITION; CONTACT MADE IN 'POS3'

LIMIT SWITCHES

- DESC1 DESC2 ZS1 — NORMALLY OPEN
- DESC1 DESC2 ZS2 — NORMALLY CLOSED
- DESC1 DESC2 ZS3 — NORMALLY OPEN HELD CLOSED
- DESC1 DESC2 ZS4 — NORMALLY CLOSED HELD OPEN

PROCESS SWITCHES

- DESC1 DESC2 WS1 — TORQUE SWITCH NORMALLY OPEN CLOSE ON INCREASE TORQUE
- DESC1 DESC2 WS2 — TORQUE SWITCH NORMALLY CLOSED OPEN ON INCREASE TORQUE
- DESC1 DESC2 LS1 — LIQUID LEVEL SWITCH NORMALLY OPEN CLOSE ON RISE
- DESC1 DESC2 LS2 — LIQUID LEVEL SWITCH NORMALLY CLOSED OPEN ON RISE
- DESC1 DESC2 FS1 — FLOW SWITCH NORMALLY OPEN CLOSE ON INCREASE FLOW
- DESC1 DESC2 FS2 — FLOW SWITCH NORMALLY CLOSED OPEN ON INCREASE FLOW
- DESC1 DESC2 PS1 — PRESSURE SWITCH NORMALLY OPEN CLOSE ON RISE
- DESC1 DESC2 PS2 — PRESSURE SWITCH NORMALLY CLOSED OPEN ON RISE
- DESC1 DESC2 TS1 — TEMPERATURE SWITCH NORMALLY OPEN CLOSE ON RISE
- DESC1 DESC2 TS2 — TEMPERATURE SWITCH NORMALLY CLOSED OPEN ON RISE

PILOT LIGHTS

- PL1 / A — PILOT LIGHT COLOR: AMBER
- PL2 / R — PUSH TO TEST PILOT LIGHT

COLOR CODES
A-AMBER
W-WHITE
R-RED
B-BLUE
G-GREEN

DEVICE ID / DRAWING CROSS REFERENCE

XX### — SEQUENCE 00-99; DRAWING CROSS REFERENCE 1-99; FAMILY CODE ABREVIATION
EXAMPLE: CR2100
#####X-### — DRAWING NUMBER 000-999; SEPARATOR; PANEL DESIGNATION A-X; PROJECT NUMBER

MISCELLANEOUS

- CB1 / ##AMP — CIRCUIT BREAKER WITH AMPERAGE
- FU1 / ##AMP — FUSE WITH AMPERAGE
- AH1 — AUDIBLE DEVICE
- ETM1 — ELAPSED TIME METER
- R1 / 250 OHMS — RESISTOR 250 OHM
- D1 — RECTIFIER, DIODE
- C1 — CAPACITOR, ELECT.
- XF1 H1 H2 H3 H4 X1 X2 / ##VAC — TRANSFORMER SECONDARY VOLTAGE AND RATING INDICATED AS APPLICABLE

INSTRUMENTATION DEVICES

- FQ / # — SUBPANEL MOUNTED DEVICE WITH LOOP OR SEQUENCE NUMBER
- LI / # — PANEL MOUNTED DEVICE WITH LOOP OR SEQUENCE NUMBER
- FT / # — FIELD MOUNTED DEVICE WITH LOOP OR SEQUENCE NUMBER

RESERVED WIRE NUMBERS

1	120VAC PANEL HOT	7	LOW VOLTAGE AC HOT
N	120VAC PANEL NEUTRAL	8	LOW VOLTAGE AC NEUTRAL
3	24V DC POSITIVE	10	GROUND FAULT CIRCUIT HOT
4	24V DC COMMON	N2	GROUND FAULT CIRCUIT NEUTRAL
5	12V DC POSITIVE		
6	12V DC COMMON		

INPUT/OUTPUT DEVICES

- 0/0/0 — DIGITAL INPUT ADDRESS: RACK/SLOT/POINT
- 0/0/0 — DIGITAL OUTPUT ADDRESS: RACK/SLOT/POINT
- AI 0/0/0 — ANALOG INPUT ADDRESS: RACK/SLOT/POINT
- AO 0/0/0 — ANALOG OUTPUT ADDRESS: RACK/SLOT/POINT

COIL CONTACTS

- CR1 — NORMALLY OPEN CONTACT
- CR2 — NORMALLY CLOSED CONTACT
- TD1 — NORMALLY OPEN CONTACT ON DELAY
- TD2 — NORMALLY CLOSED CONTACT ON DELAY
- TD3 — NORMALLY OPEN CONTACT OFF DELAY
- TD4 — NORMALLY CLOSED CONTACT OFF DELAY

WIRE COLOR STANDARDS

BLK	BLACK, INCOMING POWER AC
WHT	WHITE, NEUTRAL AC
GRN	GREEN, GROUND
RED	RED, CONTROL POWER AC
BLU	BLUE, CONTROL POWER DC
BLU/S	BLUE WITH STRIP, CONTROL POWER COMMON DC
SHLD	SHIELDED 2 CONDUCTOR BLACK(+) WHITE(-), LOW SIGNAL CIRCUITS
YEL	YELLOW, SEPARATE EXTERNAL CONTROL POWER SOURCE

ISA CODES

FI - FLOW RATE INDICATOR
LI - LEVEL INDICATOR
FT - FLOW TRANSMITTER
FY - FLOW INTEGRATOR
FQ - FLOW QUANTITY

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

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FINAL DESIGN SET

-

SUBJECT:
SCHEMATIC WIRING DIAGRAM
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE

CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

2	ISSUED FOR FINAL REVIEW	04-22-2021
1	ISSUED FOR 60% REVIEW	03-04-2021

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

e2 ENGINEERING
106 West Commerce Street
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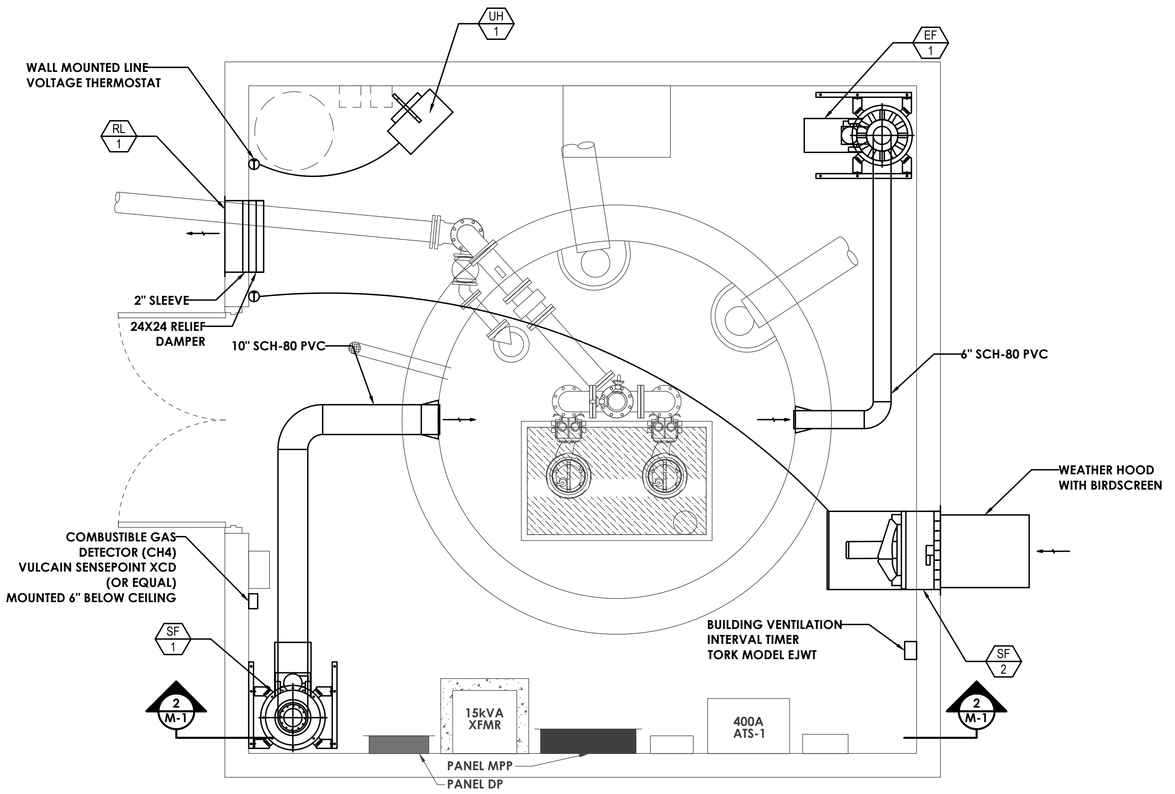
MANAGER:	EF	DATE:	APRIL 2021
DESIGNER:	EF	PROJECT NO.	1179-001
DRAWN BY:	MJG	SCALE:	AS NOTED

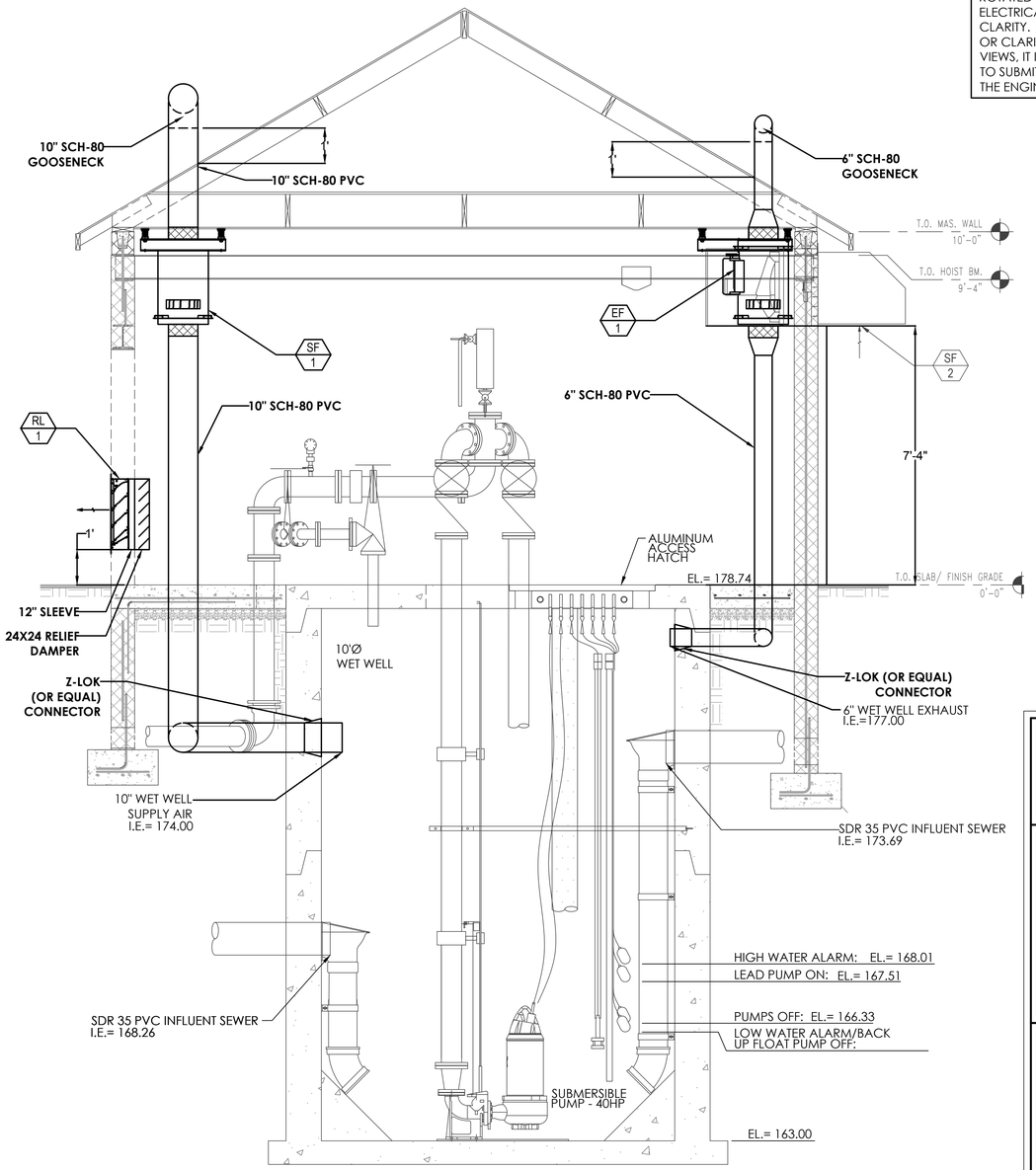
DRAWING NO.
E-5



1 M-1 CONTROL BUILDING FLOOR PLAN

SCALE: 1/2" = 1'-0"

NOTE: WET WELL SECTION VIEW, PROCESS EQUIPMENT AND ASSOCIATED PIPING IS SHOWN ROTATED 90 DEGREES FROM THE MECHANICAL, ELECTRICAL & STRUCTURAL SECTION VIEWS FOR CLARITY. IF CONTRACTOR HAS ANY QUESTIONS OR CLARIFICATIONS RELATED TO THE SECTION VIEWS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT A REQUEST FOR INFORMATION TO THE ENGINEER.



2 M-1 WET WELL - SECTION VIEW

NO SCALE

REVISIONS PER:	DATE:	BY:
1. -	-	-
2. -	-	-
3. -	-	-
4. -	-	-
5. -	-	-

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743 S. BROAD ST.
LITITZ, PA 17543
(717) 626-7271
elagroup.com

FINAL DESIGN SET

-

SUBJECT:
HVAC FLOOR PLAN
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

	ISSUED FOR FINAL REVIEW	04-22-2021
1	ISSUED FOR 60% REVIEW	03-04-2021

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

e² ENGINEERING
106 West Commerce Street
Smyrna, DE 19977
Tel: 302-659-9090

FAYDA ENGINEERING & ENERGY SOLUTIONS, LLC
801 W. Newport Pike, Wilmington, DE 19804
Tel: 302-999-1060, Fax: 302-999-1053
www.FaydaEES.com FE&ES COMM. NO: 21-1431

MANAGER:	EAU	DATE:	APRIL 2021
DESIGNER:	EAU	PROJECT NO.	1179-001
DRAWN BY:	EAU	SCALE:	AS NOTED

DRAWING NO.
M-1

Inline Centrifugal Belt Drive

MARK INFORMATION		FAN INFORMATION						MOTOR INFORMATION					
QTY	MARK	GREENHECK MODEL NUMBER	VOLUME (CFM)	TOTAL EXTERNAL SP (IN WG)	FAN RPM	OPERATING POWER (HP)	WEIGHT (LB.)	SIZE (HP)	V/C/P	ENCLOSURE	MOTOR RPM	WINDINGS	NEC FLA*
1	EF-1	TCB-1-09-4	350	0.5	1,253	0.08	108	0.25	115/60/1	EX	1725	1	5.8

*NEC FLA - Based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.

EF-1 : SELECTED OPTIONS AND ACCESSORIES
Coating - Hi-Pro Polyester, Concrete Gray-RAL 7023, Fan and Attached Accessories
Hanging, Spring, 1 Inch
Switch - NEMA-7 and 9, Toggle, Ship Separate
UL/cUL-705 - "Power Ventilators"
Extended Lube Lines - Nylon
Motor Cover - Aluminum
Mounting Rails
Fan Material- Aluminum
Spark Resistance- Spark B

Ventilation Fan Sizing

Top of Wet Well Invert	178.74	FT
Bottom of Wet Well Invert	163.00	FT
Wet Well Diameter	10.00	FT
Volume	1236.22	FT^3
Supply Fan	300.00	CFM
Air Exchanges per Hour	15	Exchanges
Minimum Air Changes/Hr.-Intermittent	12	121%

Inline Centrifugal Belt Drive

MARK INFORMATION		FAN INFORMATION						MOTOR INFORMATION					
QTY	MARK	GREENHECK MODEL NUMBER	VOLUME (CFM)	TOTAL EXTERNAL SP (IN WG)	FAN RPM	OPERATING POWER (HP)	WEIGHT (LB.)	SIZE (HP)	V/C/P	ENCLOSURE	MOTOR RPM	WINDINGS	NEC FLA*
1	SF-1	TCB-2-09-4	300	0.5	1,356	0.09	113	0.25	115/60/1	EX	1725	1	5.8

*NEC FLA - Based on tables 150 or 148 of National Electrical Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.

SF-1 : SELECTED OPTIONS AND ACCESSORIES
Coating - Hi-Pro Polyester, Concrete Gray-RAL 7023, Fan and Attached Accessories
Hanging, Spring, 1 Inch
Switch - NEMA-7 and 9, Toggle, Ship Separate
UL/cUL-705 - "Power Ventilators"
Extended Lube Lines - Nylon
Motor Cover - Aluminum
Mounting Rails
Fan Material- Aluminum
Spark Resistance- Spark B

Sidewall Direct Drive Fan

MARK INFORMATION		FAN INFORMATION						MOTOR INFORMATION				
QTY	MARK	GREENHECK MODEL NUMBER	VOLUME (CFM)	TOTAL EXTERNAL SP (IN WG)	FAN RPM	OPERATING POWER (HP)	WEIGHT (LB.)	SIZE (HP)	V/C/P	ENCLOSURE	MOTOR RPM	WINDINGS
1	SF-2	AER-S20C-615-VG	735	0.25	811	0.07	264	0.25	115/60/1	OP	950	1

SF-2 : SELECTED OPTIONS AND ACCESSORIES
UL/cUL 705 Listed - "Power Ventilators"
Airflow Direction: Supply
Damper Mounted, VCD-23-PB-22X22, Not Coated
Damper Actuator (TFB120), 115 VAC Actuated
Long Wall Hsg, Flush Exterior, w/ OSHA Grd., Ctd with Permatector, Concrete Gray-RAL 7023
Motor Access: From Int. of Bldg.
Switch, NEMA-1, Heavy Duty, Shipped with Unit
Closure Angles
Weatherhood, Aluminum 90 deg. with Bird Screen Ctd Baked Enamel, Color to be determined by Architect
Coated with Permatector, Concrete Gray-RAL 7023, Fan And Attached Acc
Wiring Pigtail, External, Auto Duty with Bond Bushings, 9 ft from Unit of Metallic Liquid-Tite

LOUVER SCHEDULE

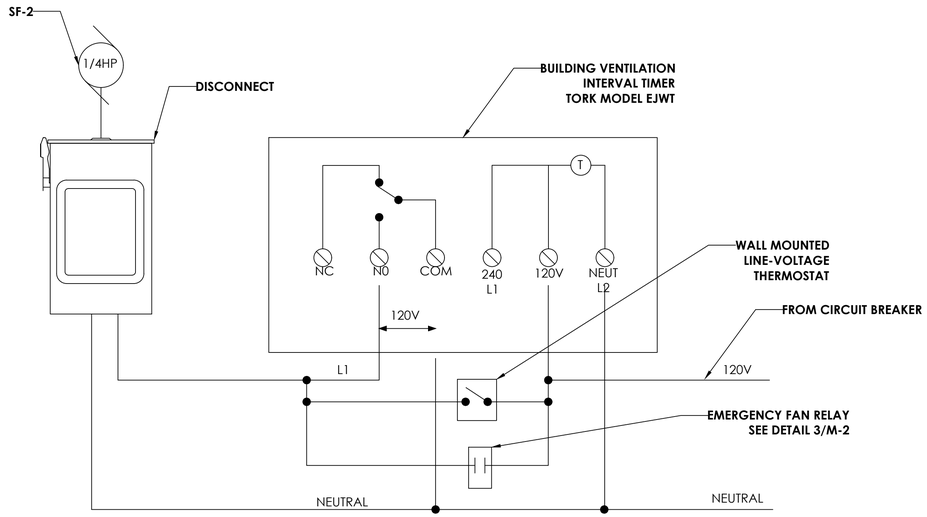
TAG	BLADE	WIDTH (IN)	HEIGHT (IN)	FREE AREA (SQ FT)	PRESSURE DROP (IN WC)	VELOCITY (FPM)	MFGR	MODEL
RL-1	DRAINABLE	24	24	1.63	0.03	439	GREENHECK	ESD-603

NOTES:
1. PROVIDE 12" ALUMINUM SLEEVE.
2. PROVIDE 2-COAT, 70% KYNAR FINISH. COLOR TO BE DETERMINED BY ARCHITECT.
3. PROVIDE .75" X .75" BIRDSCREEN.
4. PROVIDE FLANGED FRAME.
5. PROVIDE 24X24 ALUMINUM BACKDRAFT DAMPER.
6. DAMPER TO HAVE TPE BLADE SEALS AND EPDM JAMB SEALS.

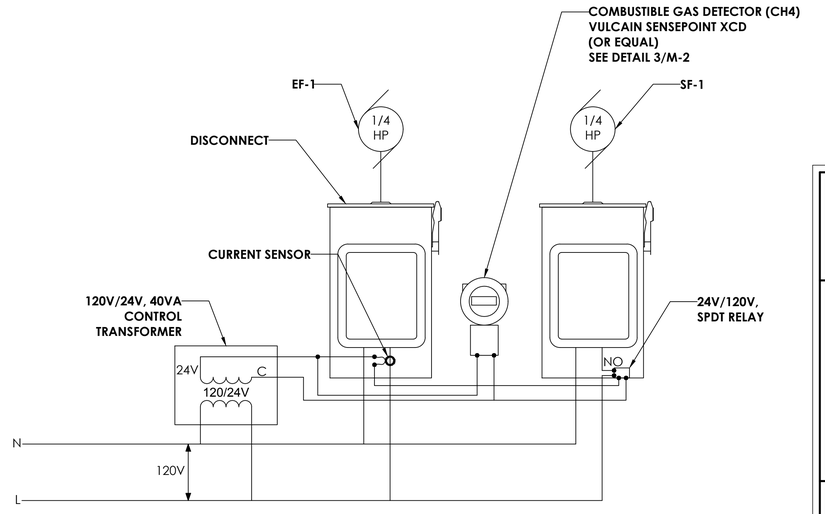
UNIT HEATER SCHEDULE

TAG	CFM	TEMP RISE (°F)	KW	MBH	VOLTAGE	AMPS	MFGR	MODEL
UH-1	575	55	10	34.1	480-3-60	12.1	TPI	P3PUH10CA1

NOTES:
1. PROVIDE 24V TRANSFORMER AND CONTACTOR.
2. PROVIDE SPST THERMOSTAT.
3. PROVIDE UNIVERSAL WALL/CEILING BRACKET.

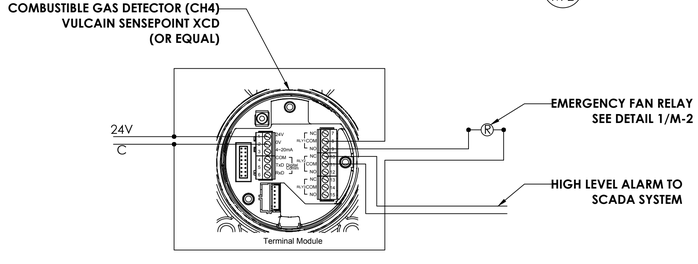


1 M-2 PUMP STATION VENTILATION-WIRING DETAIL
SCALE: NONE



NOTES:
1. FANS SHALL RUN CONTINUOUSLY.
2. SUPPLY FAN SHALL ONLY RUN IF EXHAUST FAN IS RUNNING.

2 M-2 WET WELL VENTILATION-WIRING DETAIL
SCALE: NONE



3 M-2 GAS DETECTION SENSOR-WIRING DETAIL
SCALE: NONE

REVISIONS PER:		DATE:	BY:
1.	-	-	-
2.	-	-	-
3.	-	-	-
4.	-	-	-
5.	-	-	-

EA group, inc.
ENGINEERS + LANDSCAPE ARCHITECTS
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FINAL DESIGN SET

SUBJECT:
HVAC SCHEDULES AND DETAILS
FOR
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CLIENT:
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MANAGER:	EAU	DATE:	APRIL 2021
DESIGNER:	EAU	PROJECT NO.	1179-001
DRAWN BY:	EAU	SCALE:	AS NOTED

DRAWING NO.
M-2

GENERAL STRUCTURAL NOTES

GENERAL STRUCTURAL NOTES:

1. The structural drawings shall be used in conjunction with the drawings of all other disciplines and the specifications. The contractor shall verify the requirements of other trades as to sleeves, chases, hangers, inserts, anchors, holes and other items to be placed or set in the structural work.

2. The contractor shall be responsible for complying with all safety precautions and regulations during the work. The engineer will not advise on nor issue direction as to safety precautions and programs.

3. The structural drawings herein represent the finished structure. The contractor shall provide all temporary guying and bracing required to erect and hold the structure in proper alignment until all structural work and connections have been completed. The investigation, design, safety, adequacy and inspection of erection bracing, shoring, temporary supports, etc. is the sole responsibility of the contractor.

4. The engineer shall not be responsible for the methods, techniques and sequences of procedures to perform the work. The supervision of the work is the sole responsibility of the contractor.

5. Drawings indicate general and typical details of construction. Where conditions are not specifically shown, similar details of construction shall be used, subject to approval by the engineer.

6. Loading applied to the structure during the process of construction shall not exceed the safe load-carrying capacity of the structural members. The live loadings used in the design of this structure are indicated in the "Design Criteria Notes". Do not apply any construction loads until structural framing is properly connected together and until all temporary bracing is in place.

7. All ASTM and other references are per the latest editions of these standards, unless otherwise noted.

8. In accordance with Section 1704 of IBC 2018, special inspections will be required for this project. Special inspections shall be performed in accordance with the "Schedule of Special Inspections". All fabricators shall satisfy the "Exception" noted in section 1704.2.5.1, which requires the fabricator to maintain an agreement with an approved independent inspection or quality control agency. The contractor shall notify the special inspector at least 48 hours in advance for work that will require inspection or testing

9. Contractors shall visit the site prior to bid to ascertain conditions which may adversely affect the work or cost thereof.

10. Dimensions shown on the site/civil, mechanical, electrical and plumbing drawings shall govern over dimensions shown on the structural drawings. The contractor shall generate an RFI regarding discrepancies prior to construction.

SUBMITTAL & SHOP DRAWING NOTES:

1. Shop drawings and other items shall be submitted to the engineer for review prior to fabrication. The engineer's review is to be for conformance with the design concept and general compliance with the relevant contract documents. The engineer's review does not relieve the contractor of the sole responsibility to review, check and coordinate the shop drawings prior to submission. The contractor remains solely responsible for errors and omissions associated with the preparation of shop drawings as they pertain to member sizes, details, dimensions, etc.

2. Submit shop drawings as per note #3 below. In no case shall reproduction of the contract drawings be used as shop drawings. As a minimum, submit the following items for review:
   A. Concrete mix design(s).
   B. Reinforcing steel shop drawings.
   C. Structural steel shop drawings.

Other submittals may be required per the "Schedule of Special Inspections" or the separate notes contained herein.

3. Contractor shall submit electronic shop drawings. Any additional shop drawings submitted will not be reviewed or returned.

4. Contractor shall submit a schedule indicating when each set of shop drawings will be submitted to engineer prior to any shop drawing submission.

5. All notes or questions from the detailer to the engineer shall be clouded, numbered and with the text "Engr. review." Any notes or questions from the detailer to the contractor shall be clouded, numbered and with the text "G.C. Review."

6. All shop drawings shall be reviewed by the contractor before submittal to the engineer or architect. Shop drawings will be rejected if the contractor has not reviewed the shop drawings prior to submittal to engineer.

7. The contractor shall produce all shop drawings. Copying, scanning and/or reusing any portion of the structural drawings as part of the shop drawings submittal is not permitted. Submittals that include reproduced portions of the structural drawings will be rejected without review.

DESIGN CRITERIA NOTES:

1. The intended design standards and/or criteria are as follows:
General: Uniform statewide bldg. code (IBC 2018, Chapter 16 as amended)
Concrete: ACI 318-14
Masonry: TMS 402/602-16
Structural Steel: ANSI/AISC 360-16 A.S.D. (15TH Edition)
Wood: NDS-2018
Foundations: Geotechnical Investigation and Report completed by John D. Hynes & Associates Inc. dated 11/15/2019 (JDH Project No. JDH-10/19/415)

2. Design gravity dead loads used in the design of this structure are as follows (refer to IBC 2018 section 1606):

Roof	15 PSF Max.	9 PSF Min.
Ceiling	15 PSF	
Floor	On-grade	
All other	Actual weight	

3. Design gravity live loads used in the design of this structure are as follows (refer to IBC 2018 section 1607):

Roof	20 PSF
Ceiling	20 PSF
Floor	250 PSF
Equipment Hoist	1 ton

4. The structure has been designed as Risk Category III in accordance with IBC 2018 table 1604.5.

5. Design lateral live loads used in the design of this structure, in accordance with Chapters 11 through 31 of ASCE 7-16, are as follows:
Wind - Ultimate, main system: 121 mph, Exposure B, Iw = 1.0
Wind - Ultimate, components: 121 mph, Exposure B, Iw = 1.0

Seismic: SDS = 0.198g, SD1 = 0.076g, Design Cat. B, Ie = 1.25, Site Class D
Cs = 0.123, R = 2, Base Shear = 1.6 Kips

6. Design snow loads used in the design of this structure, in accordance with Chapter 7 of ASCE 7-16, are as follows:
Pg (ground snow load) = 25 PSF, Ce = 1.0, Is = 1.1, Ct = 1.0
Pf (flat roof) = 19.3 PSF, Cs = 0.99
Ps (Balanced/sloped roof) = 19.1 PSF
Ps (Unbalanced Windward) = 0.0 PSF
Ps (Unbalanced Leeward) = 27.5 PSF

7. The lateral load resisting system of this building consists of: ordinary reinforced masonry shear walls.

8. This structure has been designed with "safety factors" in accordance with generally accepted principles of structural engineering. The fundamental nature of the "safety factor" is to compensate for uncertainties in the design, fabrication and erection of structural building components. It is intended that "safety factors" be used so that the load carrying capacity of the structure does not fall below the design load and that the building will perform under design load without distress. While the use of "safety factors" implies some excess capacity beyond design load, such excess capacity cannot be adequately predicted and SHALL NOT BE RELIED UPON.

SUBGRADE PREPARATION NOTES:

1. All site preparation shall conform to the requirements of IBC 2018 Chapter 18 and the Geotechnical Engineering Report prepared by John D. Hynes & Associates Inc. dated 11/15/2019.

2. Within an area a minimum of 10 feet beyond the building limits, excavate a minimum of 4" of existing soil. Remove all organics, pavement, roots, debris and otherwise unsuitable material.

3. The surface of the exposed subgrade shall be inspected by probing or testing to check for pockets of soft or unsuitable material. Excavate unsuitable soil as directed by the geotechnical engineer/testing agency.

4. Proofroll the surface of the exposed subgrade with a loaded tandem axle dump truck. Remove all soils which pump or do not compact properly as directed by the geotechnical engineer/testing agency.

5. Fill all excavated areas with approved controlled fill. Place in 8 inch loose lifts and compact to a minimum of 95% of the maximum dry density in accordance with ASTM D-1557.

6. All controlled fill material shall be a select granular material free from all organics or otherwise deleterious material with not more than 20% by weight passing a No. 200 sieve (classified as SC, SM, SP or better in accordance with the unified soil classification system) and with a plasticity index not exceeding 6%.

7. Provide field density tests for each lift of controlled fill.

FOUNDATION NOTES:

1. All foundation construction shall conform to the requirements of IBC 2018 Chapter 18 and the Geotechnical Engineering Report prepared by John D. Hynes & Associates Inc. dated 11/15/2019.

2. All footings have been designed based upon an assumed soil bearing pressure of 2,000 psf. All footings shall bear on undisturbed, firm natural soil or compacted fill. All foundation excavations shall be evaluated by the geotechnical engineer/testing agency prior to pouring foundation concrete.

3. Top of footing elevation shall be as shown on the foundation plan. These elevations are a maximum and shall be lowered as required to obtain the required design bearing pressure or lowered below new or existing utilities per typical details.

4. All foundation concrete shall obtain a 28 day compressive strength of 3,000 psi. All concrete to be permanently exposed to weather shall be air entrained to 5% (±1%) with an admixture that conforms to ASTM C-260.

5. All concrete work shall conform to the requirements of ACI 301, "Specification for Structural Concrete Buildings". Hot weather concreting shall be in accordance with ACI 305. Cold weather concreting shall be in accordance with ACI 306.

6. All reinforcing steel shall conform to ASTM A-615, Grade 60. Reinforcing shall be detailed and installed per ACI 315 and CRSI Manual of Standard Practice.

7. Unless otherwise noted, the following concrete cover shall be provided for reinforcement.
   A. Concrete cast against and permanently exposed to earth: 3"
   B. Concrete exposed to earth or weather:
      #6 through #18 bars: 2"
      #5 bar, W31 or D31 wire and smaller: 1-1/2"

8. All reinforcing marked continuous (cont.) on the plans and details shall be lapped 36xbar diameters at splices unless otherwise noted.

9. No unbalanced backfilling shall be placed against foundation walls unless walls are securely braced against overturning, either by temporary bracing or by permanent construction.

10. Prior to commencing any foundation work, coordinate work with any existing utilities. Foundations shall be lowered where required to avoid utilities.

11. All wall and column footings are to be side formed. Earth forms are not permitted.

SLAB ON GRADE NOTES:

1. Slab-on-grade construction shall conform to the requirements of ACI 301, "Specification for Structural Concrete Buildings" and IBC 2018 Section 1907 and the Geotechnical Engineering Report prepared by John D. Hynes & Associates Inc. dated 11/15/2019.

2. Provide concrete slabs as indicated on plans over a 15 mil polyethylene vapor barrier and 4" of porous fill as follows:
8" slab reinforced with #4 @ 12" O.C. each way and with 4000 psi mix concrete.
Maximum slump for all concrete slabs shall be 5 inches, using type I cement.

3. All porous fill material shall be a clean granular material with 100% passing a 1-1/2" sieve and no more than 5% passing a no. 4 sieve. Porous fill shall be compacted to 95% max. dry density per ASTM D-698.

4. Slab joints shall be filled with approved material. This should take place as late as possible, preferably 4 to 6 weeks after the slab has been cast. Prior to filling, remove all debris from the slab joints, then fill in accordance with the manufacturer's recommendations as follows: fill with epoxy resin.

5. Unless otherwise approved, all reinforcement shall be blocked into the position indicated with precast concrete blocks having a compressive strength equal to that of the slab.

6. Walkways and other exterior slabs are not indicated on the structural drawings. See the site plan for locations, dimensions, elevations, jointing details and finish details. Provide 4" walks reinforced with 6x6 - W1.4xW1.4 WWF unless otherwise noted.

7. Slabs to be permanently exposed to weather shall be air entrained to 5% (±1%) with an admixture that conforms to ASTM C-260.

8. All concrete work shall conform to the requirements of ACI 301, "Specification for Structural Concrete Buildings". Hot weather concreting shall be in accordance with ACI 305. Cold weather concreting shall be in accordance with ACI 306.

9. In order to avoid concrete shrinkage cracking, the maximum spacing of joints shall be 12 feet.

10. The use of polypropylene fibers (in lieu of steel reinforcing bars) is prohibited without the written authorization of the engineer.

11. See the site/civil, mechanical, electrical and plumbing drawings for exact locations of depressed slab areas and drains. Slope slab to drains where shown.

12. The finish tolerance of all slabs shall be in accordance with ACI 302, Section 8.4.

13. Slabs shall be constructed in accordance with the following flatness/levelness requirements:

Slab Category	Specified	Local Minimum
Flat	$F_F = 35$, $F_L = 30$	$F_F = 24$, $F_L = 20$

Floor flatness and levelness tests shall be conducted by the owner in accordance with ASTM E 1155. Results, including acceptance or rejection of the work will be provided to the contractor within 48 hours after data collection. Remedies for out of tolerance work shall be in accordance with the specifications.

ABBREVIATIONS

@	AT	K	KIPS
ø	DIAMETER	L	ANGLE
2X	TWO BY	(LLH)	LONG LEG HORIZONTAL
(4)	QUANTITY OF 4	(LLV)	LONG LEG VERTICAL
A.B.	ANCHOR BOLT	LOC.	LOCATION
A.P.	ANCHOR POINT	LG.	LONG
ADD'L.	ADDITIONAL	L.R.F.D.	LOAD & RESISTANCE FACTOR DESIGN
ADJ.	ADJACENT	LSL	LAMINATED STRAND LUMBER
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	LVL	LAMINATED VENEER LUMBER
AL.	ALUMINUM	M.A.	MASONRY ANCHOR
ARCH.	ARCHITECT/ARCHITECTURAL	MAX.	MAXIMUM
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS	MIN.	MINIMUM/MINIMIZE
AWS	AMERICAN WELDING SOCIETY	MANF.	MANUFACTURER
BCX	BOTTOM CHORD EXTENSION	MECH.	MECHANICAL
BEL.	BELOW	M.O.	MASONRY OPENING
BLKG.	BLOCKING	MTL.	METAL
BM.	BEAM	(N)	NEW
BOT.	BOTTOM	N.S.	NEAR SIDE
B.O.	BOTTOM OF	N.S.G.	NON-SHRINK GROUT
BTWN.	BETWEEN	O.C.	ON CENTER
C	CHANNEL	OPN'G.	OPENING
CFSF	COLD-FORMED STEEL FRAMING	OPP.	OPPOSITE
CL	CENTER/COLUMN LINE	P.C.	PRE-CAST
CLR.	CLEAR	PL	PLATE
C.J.	CONTROL/CONSTRUCTION JOINT	PLYWD.	PLYWOOD
CMU	CONCRETE MASONRY UNIT	PMF	PRE-MOLDED FILLER
COL.	COLUMN	PSL	PARALLEL STRAND LUMBER
CONC.	CONCRETE	P.T.	PRESSURE TREATED
CONN.	CONNECTION	R/C	REINFORCED CONCRETE
CONT.	CONTINUOUS	REINF.	REINFORCING
CONTR.	CONTRACTOR	REQ'D.	REQUIRED
COORD.	COORDINATE	RTU	ROOF TOP UNIT
DBL.	DOUBLE	SCH.	SCHEDULE
DET.	DETAIL	SECT.	SECTION
DN.	DOWN	SF	STRIP FOOTING
DWL.	DOWEL	SHT'G.	SHEATHING
DWG.	DRAWING	SIM.	SIMILAR
EA.	EACH	SL	SLOPE
E.F.	EACH FACE	S.O.G.	SLAB-ON-GRADE
ELEV.	ELEVATION	S.S.	STAINLESS STEEL
EQ.	EQUAL	STL.	STEEL
E.S.	EACH SIDE	SQ.	SQUARE
E.W.	EACH WAY	T&B	TOP AND BOTTOM
EX.	EXISTING	TCX	TOP CHORD EXTENSION
EXP.	EXPANSION	THK.	THICK
FLG.	FLANGE	TJI	TRUSS JOIST I-SHAPED JOISTS
FLR.	FLOOR	T.O.	TOP OF
FDN.	FOUNDATION	TYP.	TYPICAL
F.O.	FACE OF	U.N.O.	UNLESS NOTED OTHERWISE
F.S.	FAR SIDE	VERT.	VERTICAL
FTG.	FOOTING	V.L.D.	VERTICAL LEG DOWN
GALV.	GALVANIZED	V.I.F.	VERIFY IN FIELD
G.C.	GENERAL CONTRACTOR	WD.	WOOD
HK.	HOOK	W/	WITH
HGR.	HANGER	W/O	WITHOUT
HSS	HOLLOW STRUCTURAL SECTION	W.P.	WORK POINT
HORIZ.	HORIZONTAL	W.R.T.	WITH RESPECT TO
HT.	HEIGHT	W.W.F.	WELDED WIRE FABRIC
INT.	INTERIOR	WF	WIDE FLANGE BEAM
JST.	JOIST	W	WIDE FLANGE BEAM
JT.	JOINT	X	CROSS

SYMBOL KEY

CMU
BRICK
CONCRETE
PRECAST CONCRETE
WOOD ELEVATION
WOOD SECTION
STEEL
GRATING
ALUMINUM
SHEAR WALL
EARTH
CRUSHED STONE/ BUILDING STONE

STRUCTURAL DRAWING LIST

PRELIMINARY - NOT FOR CONSTRUCTION - 04.21.21

JBA Joseph Barbato Associates
STRUCTURAL ENGINEERS · ACHIEVING A HIGHER LEVEL
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REVISIONS PER:	DATE:	BY:
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95% DESIGN SET

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CLIENT:
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NEWARK, DE 19702
(302) 453-6900

MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

DRAWING NO.
S-1

GENERAL STRUCTURAL NOTES

POST-INSTALLED ANCHORS NOTES:

1. Except where indicated on the drawings, post-installed anchors shall consist of the following anchor types as provided by HILTI, Inc. Contact HILTI at (800) 879-8000 for product related questions.
   A. Anchorage to concrete
      1. Adhesive anchors for cracked and uncracked concrete use:
         A. Adhesives for use:
            1. HILTI HIT-HY 200 safe set system with HILTI HIT-Z rod per ICC ESR-3187
            2. HILTI HIT-HY 200 safe set system with HILTI hollow drill bit and vacuum with has threaded rod per ICC ESR-3187
         B. Steel elements for use with adhesive:
            1. HILTI HAS-V-36 grade 36 carbon steel rod
      2. Basis of design includes the following design parameters:
         A. Cracked concrete
         B. Water-saturated concrete
         C. Base material temperature of 23-104 degrees Fahrenheit
         D. Allowable with hammer-drill, hollow drill bit system, and core drilling methods
   B. Rebar doweling into concrete
      1. Adhesive anchors for cracked and uncracked concrete use:
         A. HILTI HIT-HY 200 safe set system with HILTI hollow drill bit and vacuum with continuously deformed rebar per ICC ESR-3187
      2. Basis of design includes the following design parameters:
         A. Cracked concrete
         B. Water-saturated concrete
         C. Base material temperature of 23-104 degrees Fahrenheit
         D. Allowable with hammer-drill, hollow drill bit system, and core drilling methods
         E. Current ICC-ES report with approval for development of bar using ACI provisions for embedment depths greater than 20 bar diameters
   C. Anchorage to solid grouted masonry
      1. Adhesive anchors use:
         A. HILTI HIT-HY 270 safe set system with HILTI hollow drill bit and vacuum per ICC ESR-4143
         B. Steel anchor element shall be HILTI has continuously threaded rod or continuously deformed steel rebar
      2. Mechanical anchors use:
         A. HILTI KWIK BOLT-1 expansion anchor per ICC ER-677
         B. HILTI KWIK BOLT-TZ2 expansion anchor per ICC ESR-4561
         C. HILTI KH-EZ, KH-EZ CRC, KH-EZ SS316, KH-EZ C, AND KH-EZ P screw anchors per ICC ESR-3056

2. Anchor capacity used in design shall be based on the technical data published by HILTI or other such method as approved by the structural engineer of record. Substitution requests for alternate products must be approved in writing by the structural engineer of record prior to use. Contractor shall provide calculations that have been sealed by another licensed engineer demonstrating that the substituted product is capable of meeting the performance of the specified product. Substitutions will be evaluated by their having an ICC ESR showing compliance with the relevant building code for seismic uses, load resistance, installation category, and availability of comprehensive installation instructions. Adhesive anchor evaluation will also consider creep, in-service temperature, installation temperature, moisture condition of concrete, and drilling methods.

3. Use of diamond core bit with roughening tool for anchor holes requires approval from engineer of record prior to drilling. Unless otherwise shown in the drawings, all holes shall be drilled perpendicular to the concrete surface.

4. Install anchors per the manufacturer's printed installation instructions, as included in the anchor packaging.

5. For projects meeting IBC 2012 or later, ACI/CRSI adhesive anchor installer certification is required for all installers of adhesive anchors in horiztonal or upwardly inclined orientation. The HILTI Adhesive Anchor Installer Certification Program (HAAICP) is an approved equivalent.

6. The contractor shall arrange an anchor manufacturer's representative to provide onsite installation training for all anchor products specified. The structural engineer of record must receive documented confirmation that all personnel who install anchors are trained prior to the commencement of anchor installation.

7. Anchor capacity is dependent upon spacing between adjacent anchors and proximity of anchors to edge of concrete. Install anchors in accordance with spacing and edge clearances indicated on the drawings.

MASONRY NOTES:

1. Masonry construction shall conform to the requirements of the "Building Code Requirements and Specification for Masonry Structures (TMS 402/602-16)", published by The Masonry Society, Longmont, Colorado, and IBC 2018 Chapter 21.

2. Hollow load-bearing masonry units shall conform to ASTM C-90 and be made with normal-weight aggregate. The minimum prism compressive strength (f'm) shall be 1,500 psi at an age of 28 days, as determined by the unit strength method of TMS 402/602-16.

3. Fill all bond beams, below grade and reinforced cells solidly with grout. Grout shall conform to ASTM C-476 and shall obtain a min. 28 day compressive strength of 2,500 psi.

4. Reinforcing steel shall be in accordance with ASTM A-615, grade 60. Shop fabricate reinforcing bars which are shown to be hooked or bent. Provide a minimum lap of 48 x bar diameters at all splices, unless indicated otherwise.

5. The use of masonry-cement mortar is strictly prohibited. Mortar shall conform to ASTM C-270, type S. All mortar shall meet the "Proportion Specification" of ASTM C-270 and be made with Portland cement/lime (non air-entrained).

6. Unless otherwise indicated, all walls shall be laid in running bond. Bond corners and intersections of load-bearing walls.

7. Provide vertical reinforcing bars of the given size and spacing as indicated. Provide bars at all wall corners, intersections and opening edges. Masonry walls shall be constructed in accordance with the "low-lift" or "high-lift" methods. "High-lift" masonry construction is limited to specially qualified contractors meeting the following minimum requirements:
   A. Successful completion of at least 3 previous projects that utilized "high-lift" wall construction.
   B. Contractor shall submit a detailed "high-lift" wall construction procedure for approval, including the documentation of all personnel who have successfully been trained in "high-lift" masonry construction.

8. Provide rebar dowels from foundations to match vertical reinforcing size and spacing. Dowels shall have standard 90 degree hooks and lap with the first lift of reinforcing.

9. Provide horizontal bond beams with continuous reinforcing as indicated. Discontinue all horizontal reinforcing at control joints except for the bond beams at bearing elevations.

10. Provide standard, galvanized 9 gauge horizontal joint reinforcing at 16" on center in all walls. Provide ladder type joints reinforcing for all concrete masonry. Unless otherwise noted, stop all horizontal joint reinforcing at control joints.

11. Provide lintels above all wall openings per typical details and schedule. See the architectural drawings for locations of all door and window openings.

12. Provide steel beam bearing plates and other accessories as indicated. Provide 3 courses of solidly grouted CMU below all beam bearings over a width of 2'-8", centered on the wall, per typ. beam bearing detail on sht. S-7.

13. Provide CMU control joints as indicated on the drawings. Where beams or lintels bear at CMU control joints, offset and lap the vertical reinforcing as indicated.

14. The masonry contractor shall provide all required temporary wall bracing during construction (see "General Structural Notes").

15. Hot weather masonry work shall be in accordance with TMS 402/602-16. Cold weather masonry work shall be in accordance with TMS 402/602-16.

STRUCTURAL STEEL NOTES:

1. All structural steel shall conform to the AISC "Manual of Steel Construction" (15th Edition) and IBC 2018 Chapter 22.

2. Unless otherwise noted, all materials shall be in accordance with the following ASTM specifications:

Member	ASTM	Fy (Min. Strength)
W	A992	50 KSI
Plates/shapes	A36/A572 (Gr. 50)	36 KSI/50 KSI
Anchor bolts	F1554 (Gr. 55, Supplement S1)	55 KSI
Threaded rods	A36	36 KSI
Non-shrink grout	C1107	8000 PSI

3. Minimum bolt diameter shall be 3/4". Unless otherwise noted all bolts shall be shear/bearing type bolts and be "snug-tight".

4. All welding shall be in accordance with AWS D1.1 using E70XX electrodes. Unless otherwise noted, provide cont. min. sized fillet welds per AISC requirements. All filler material shall have a minimum yield strength of 70 KSI.

5. Holes in steel shall be drilled or punched. All slotted holes shall be provided with smooth edges. Burning of holes and torch cutting at the site is not permitted.

6. Unless otherwise noted, all structural steel permanently exposed to view shall be shop painted with one coat of SSPC 15-68, type 1 (red oxide) paint.

7. Unless otherwise noted, all structural steel permanently exposed to the weather, including all lintels in exterior walls, shall be hot-dipped galvanized in accordance with ASTM A153.

8. Protective coatings damaged during the transporting, erecting and field welding processes shall be repaired in the field to match the shop applied coating.

9. Finish welds shall be ground smooth and free of burrs.

10. Finished galvanized surfaces shall be smooth and free of galvanized paint bead build up from multiple layer applications.

PLYWOOD SHEATHING NOTES:

1. All plywood construction shall be in accordance with the American Plywood Association (APA) specifications and IBC 2018 Chapter 23.

2. All roof sheathing shall be 3/4" (nom.) type CDX, exp. 1 APA rated sheathing. Suitable edge support shall be provided by use of panel clips or blocking between framing. Unless otherwise noted connect roof sheathing with 8d common nails at 6" o/c at supported panel edges and 6" o/c at intermediate supports.

3. All gable end wall sheathing shall be 1/2" (nom.) type CDX, exp. 1 APA rated sheathing. Unless otherwise indicated, connect wall sheathing with 10d common nails spaced 6" o/c at supported panel edges and 12" o/c at intermediate supports.

4. Install all plywood sheathing with the long dimension of the panel across supports and with panel continuous over two or more spans. Stagger panel end joints. Allow 1/8" spacing at panel ends and edges unless otherwise recommended by the sheathing manufacturer.

5. All nailing shall be carefully driven and not overdriven.

WOOD FRAMING NOTES:

1. All wood framing material shall be surfaced dry and used at 19% maximum moisture content. Allowable stress requirements of all material shall be in accordance with the "Schedule of Required Stress Values", as follows:

Wood Species	Bending Stress	Tensile Stress	Shear Stress	Compression Stress		Modulus of Elasticity
	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi) perpendicular to grain	Fc (psi) parallel to grain	E (psi)
SP	1200	650	90	565	1150	$1.6X10^6$
DF-L	875	575	95	625	1350	$1.6X10^6$
SPF	875	450	70	425	1150	$1.4X10^6$
HF	850	525	75	405	1300	$1.3X10^6$
SYP	1050	450	90	565	1450	$1.4X10^6$

2. All stud and wall framing shall be either of the following:
   A. No. 2 grade Southern Yellow Pine (syp)
   B. No. 2 grade Spruce-Pine-Fir (spf)
   "Stud" grade material is strictly prohibited from use.

3. All joist, rafter and misc. framing shall be no. 2 grade, Southern Pine. Provide full-depth (or metal) bridging at midspan and at a maximum spacing of 8'-0" o/c in between.

4. All framing exposed to the weather or in contact with masonry or concrete shall be pressure-treated in accordance with the American Wood Preservers Association specifications. Where possible, all cuts and holes should be completed before treatment. Cuts and holes due to on-site fabrication shall be brushed with 2 coats of copper naphthenate solution containing a minimum of 2% metallic copper in solution (per AWPA std. M4).

5. The contractor shall carefully select lumber to be used in loadbearing applications. The length of split on the wide face of 2" nominal loadbearing framing shall be limited to less than 1/2 of the wide face dimension. The length of split on the wide face of 3" (nominal) and thicker lumber shall be limited to 1/2 of the narrow face dimension.

6. Provide header beams of the same size as joists or rafters to frame around openings in the plywood deck unless otherwise indicated.

7. Bolt holes shall be carefully centered and drilled not more than 1/16" larger than the bolt diameter. Bolted connections shall be snugged tight but not to the extent of crushing wood under washers.

8. Prefabricated metal joist hangers, hurricane clips, hold-down anchors and other accessories shall be as manufactured by "Simpson Strong-Tie Company", Tel. 800-999-5099, or approved equal. Install all accessories per the manufacturer's requirements. All steel shall have a minimum thickness or 0.04 inches (per ASTM A653, Grade A) and be galvanized (coating G60).

9. All nailing not otherwise indicated shall be in accordance with the "Nailing Schedule" on sheet S-3. Nailing shall not be overdriven.

10. Holes and notches drilled or cut into wood framing shall not exceed the requirements of IBC 2018 Sections 2308.4.2.4.

11. All plates, anchors, nails, bolts, nuts, washers, and other miscellaneous hardware shall be hot dip galvanized.

12. All plates, anchors, nails, bolts, nuts, washers, and other miscellaneous hardware to be in permanent contact with wood treated with Alkaline Copper Quat and/or Copper Azole shall be hot dipped galvanized (coating G185) or stainless steel type 304 or 316. Galvanized and stainless steel fasteners and connects shall not be used simultaneously in any one connection.

DOOR NOTES:

1. Shim and caulk new doors each side.

2. Provide pressure treated exterior fire retardant treated wood (FRTW) blocking.

3. Provide Sheet Metal Flashing at the head of all openings, and at sill of all masonry openings including sloped sill pan flashing. Comply with Manufacturer's installation recommendations. Provide corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

4. Install doors level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

MASONRY WALL INSULATION NOTES:

1. Fill open cores in CMU walls with "Core-Fill 500TM" as manufactured by Tailored Chemical Products, P.O. Box 4186, Hickory, N.C. 28603, (800) 627-1687. No substitutions allowed.

2. Insulation shall be installed as per manufacturer's recommendation and must come from the manufacturer pre-mixed to ensure consistency. Provide a one year product and installation warranty from both the manufacturer and installer.

3. Engage an experienced dealer/applicator who has been trained and licensed by the product manufacturer and which has not less than three years direct experience in the installation of the product used.

4. Fill all open cells and voids in hollow concrete masonry walls. The foam insulation shall be pressure injected through a series of 5/8" to 7/8"ø holes drilled into every unreinforced vertical column of block cells (every 8" on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of four (4) feet above the first horizontal row of holes (or as needed) until the void is completely filled. Patch holes with mortar and score to resemble existing surface.

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SUBJECT:
GENERAL STRUCTURAL NOTES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

DRAWING NO.
S-2

SCHEDULE OF SPECIAL INSPECTIONS:

SPECIAL INSPECTIONS SHALL BE PROVIDED IN ACCORDANCE WITH THE TABLE BELOW.

REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS: IBC 2018 TABLE 1705.6 & GEOTECHNICAL REPORT		
TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	—	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	—	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	—	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	—
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	—	X

REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION: IBC 2018 TABLE 1705.3				
TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD	IBC REFERENCE
1. INSPECTION OF REINFORCING STEEL, AND PLACEMENT.	—	X	ACI 318 CH. 20, 25.2, 25.3, 26.1–26.6.3	1908.4
2. INSPECT ANCHORS CAST IN CONCRETE.	—	X	ACI 318: 17.8.2	—
3. INSPECT ANCHORS POST–INSTALLED IN HARDENED CONCRETE MEMBERS. a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.	X —	— X	ACI 318: 17.8.2.4 ACI 318: 17.8.2	—
4. VERIFY USE OF REQUIRED DESIGN MIX.	—	X	ACI 318: CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
5. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	—	ASTM C172 ASTM C31 ACI 318: 26.4, 26.12	1908.10
6. INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	—	ACI 318: 26.5	1908.6, 1908.7, 1908.8
7. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	—	X	ACI 318: 26.5.3–26.5.5	1908.9
8. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	—	X	ACI 318: 26.11.1.2(b)	—

REQUIRED SPECIAL INSPECTIONS FOR MASONRY CONSTRUCTION: IBC 2018 1705.4 & TMS 402/ACI 520/ASCE 5 & TMS 602/ASCE 6				
TABLE 3.1.2 – LEVEL B QUALITY ASSURANCE				
MINIMUM TESTS				
VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) AS DELIVERED TO THE PROJECT SITE IN ACCORDANCE WITH SPECIFICATION ARTICLE 1.5 B.1.b.3 FOR SELF CONSOLIDATING GROUT				
VERIFICATION OF f'_m AND f'_{AAC} IN ACCORDANCE WITH SPECIFICATION ARTICLE 1.4 B PRIOR TO CONSTRUCTION, EXCEPT WHERE SPECIFICALLY EXEMPTED BY THIS CODE				
MINIMUM SPECIAL INSPECTION				
INSPECTION TASKS	FREQUENCY (a)		REFERENCE FOR CRITERIA	
	CONTINUOUS	PERIODIC	TMS 402/ASCE 5	TMS 602/ASCE 6
1. VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS		X		Art. 1.5
2. AS MASONRY CONSTRUCTION BEGINS, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:				
a. PROPORTIOINS OF SITE–PREPARED MORTAR		X		Art. 2.1, 2.6 A
b. CONSTRUCTION OF MORTAR JOINTS		X		Art. 3.3 B
c. LOCATION OF REINFORCEMENT, CONNECTORS, AND ANCHORAGES		X		Art. 3.4 B, 3.6 A
3. PRIOR TO GROUTING, VERIFY THE FOLLOWING ARE IN COMPLIANCE:				
a. GROUT SPACE		X		Art. 3.2 D, 3.2 F
b. GRADE, TYPE, AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS		X	SEC. 6.1	Art. 2.4, 3.4
c. PLACEMENT OF REINFORCEMENT, CONNECTORS, AND ANCHORS		X	SEC. 6.1, 6.2.1, 6.2.6, 6.2.7	Art. 3.2 E, 3.4, 3.6 A
d. PROPORTIONS OF SITE–PREPARED GROUT		X		Art. 2.6 B, 2.4 G.1.b
e. CONSTRUCTION OF MORTAR JOINTS		X		Art. 3.3 B
4. VERIFY DURING CONSTRUCTION				
a. SIZE AND LOCATION OF STRUCTURAL ELEMENTS		X		Art. 3.3 F
b. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION		X	SEC. 1.2.1 (e), 6.1.4.3, 6.2.1	
c. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F (4.4°C)) OR HOT WEATHER (TEMPERATURE ABOVE 90°F (32.2°C))		X		Art. 1.8 C, 1.8 D
d. PLACEMENT OF GROUT IS IN COMPLIANCE	X			Art. 3.5, 3.6 C
5. OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS		X		Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4
(a) FREQUENCY REFERS TO THE FREQUENCY OF SPECIAL INSPECTION, WHICH MAY BE CONTINUOUS DURING THE TASK LISTED OR PERIODIC DURING THE LISTED TASK, AS DEFINED IN THE TABLE.				

PROJECT LINTEL SCHEDULE (U.N.O. ON PLANS/DETAILS)

NEW EXTERIOR MASONRY WALLS	
MASONRY OPENING	LINTEL
0' < M.O. ≤ 6'–4"	L5x3 1/2x5/16 LLV PER 4" OF WALL THICKNESS
6'–4" < M.O. ≤ 10'–8"	W8x24 + 3/8" CONT. PL x WIDTH OF WALL

NOTES:
1. ALL STEEL LINTELS IN EXTERIOR WALLS TO BE GALVANIZED.
2. PROVIDE MIN. 8" BEARING EACH END OF LINTEL, U.N.O. ON PLANS AND/OR SECTIONS.
3. LINTELS ARE REQUIRED AT OPENINGS OF MORE THAN 24" FOR BLOCK–SIZE UNITS U.N.O. IF LESS THAN 8" OF MASONRY EXISTS BETWEEN ADJACENT OPENINGS THEY SHALL BE CONSIDERED AS ONE SINGLE OPENING.
4. REFER TO E/S–7 FOR TYP. LINTEL DETAILS.

NAILING SCHEDULE

FRAMING CONDITION	TYPE	COMMON NAILS
JOIST TO SILL	TOE NAIL	(3) 8d
BRIDGING TO JOIST	TOE NAIL	(2) 8d
SOLE PLATE TO JOIST OR BLOCKING	FACE NAIL	16d @ 16"O.C.
TOP PLATE TO STUD	END NAIL	(2) 16d
STUD TO SOLE PLATE	TOE NAIL	(4) 8d
BUILT–UP STUDS	FACE NAIL	16d @ 16"O.C.
DOUBLE TOP PLATES	FACE NAIL	16d @ 16"O.C.
TOP PLATES LAPS & INTERSECTIONS	TOE NAIL	(2) 16d
BUILT–UP HEADERS & BEAMS	FACE NAIL	2x 20d @ 16"O.C.
ROOF RAFTER TO PLATE	----	FRAMING ANCHOR
PLYWOOD ROOF DECK TO RAFTERS	@ EDGES	8d @ 6"O.C.
	INTERMEDIATE	8d @ 6"O.C.

NOTE:
PROVIDE STEEL PLATE CONNECTORS W/ MANUFACTURER'S NAILS WHERE INDICATED IN SCHEDULE AND ON DRAWINGS.

FOOTING SCHEDULE

MARK	SIZE	REINFORCEMENT	REMARKS
SF–24	CONT. 2'–0" x 1'–0"	(3) #5 LONG. & #5 @48" TRANS.	CONT. WALL. FTG.

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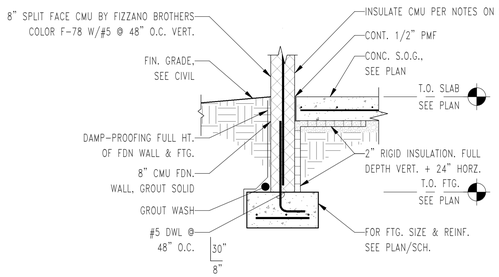
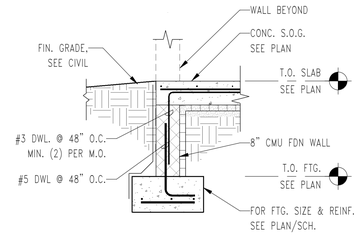
SUBJECT:
SCHEDULES
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

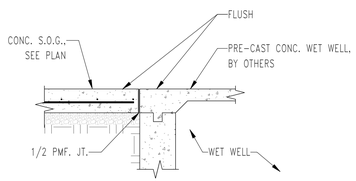
DRAWING NO.
S-3



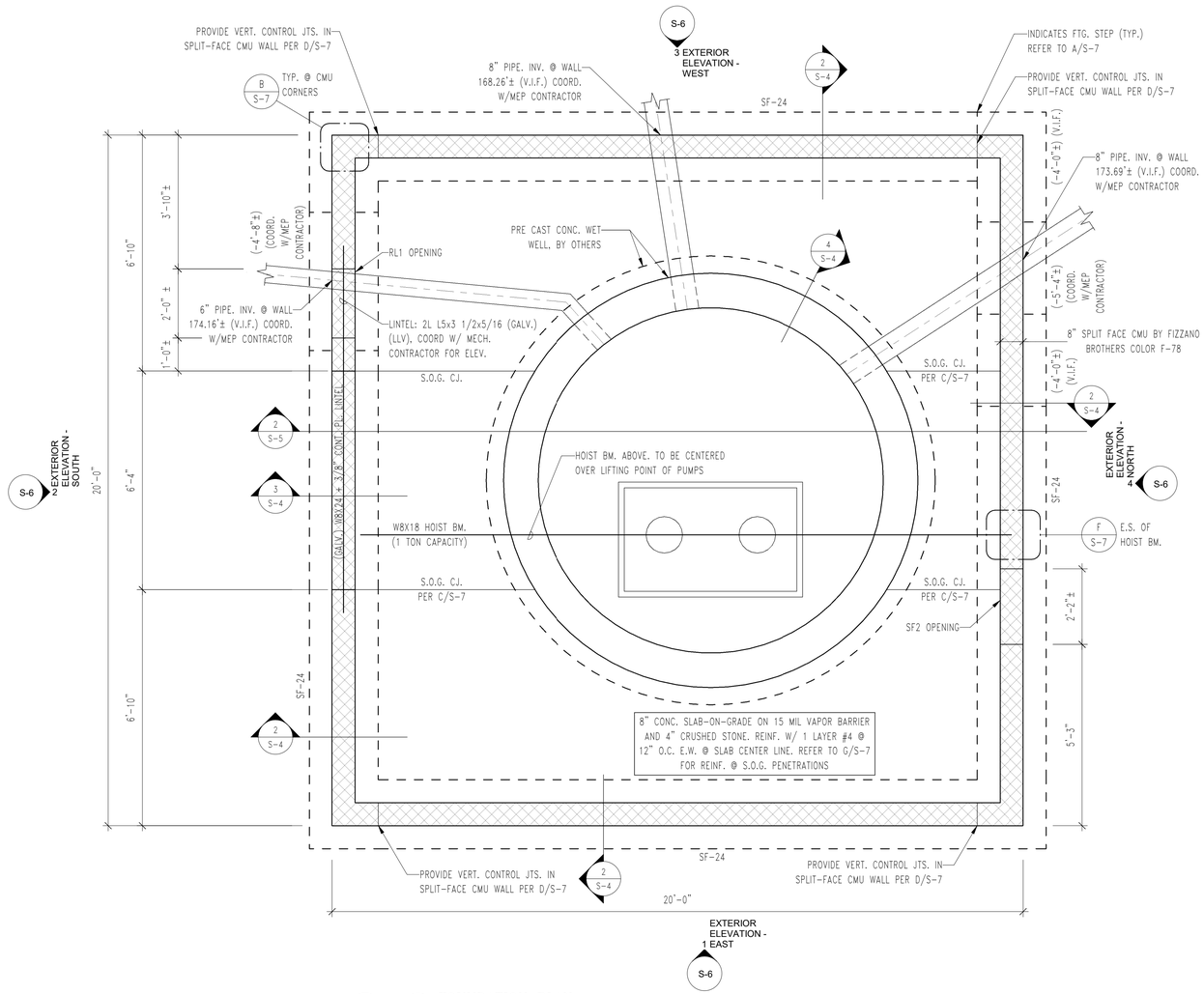
2 S-4 SECTION
SCALE: 1/2" = 1'-0"



3 S-4 SECTION @ DOOR OPENING
SCALE: 1/2" = 1'-0"



4 S-4 SECTION
SCALE: 1/2" = 1'-0"



1 S-4 FOUNDATION PLAN
SCALE: 1/2" = 1'-0"

FOUNDATION PLAN NOTES

1. REFERENCE FINISH SLAB ELEVATION = 0'-0" (DATUM ELEV. 178.74') U.N.O. ON PLAN.
2. (#'-#") INDICATES TOP OF FOOTING ELEVATION. TOP OF FOOTING ELEVATION = -2'-8" W.R.T. REF. ELEVATION 0'-0" U.N.O. ON PLAN.
3. FOUNDATION MEMBERS ARE DESIGNATED AS FOLLOWS:
   SF#.# FOOTING MARK (SEE FOOTING SCHEDULE)
4. COORDINATE WITH MECH, ELEC, AND PLUMBING DRAWINGS FOR FLOOR SLOPES, DRAINS, OPENINGS, DEPRESSIONS, ETC., NOT SHOWN ON THIS PLAN.
5. FOR GENERAL STRUCTURAL NOTES, REFER TO S-1 & S-2.
6. REFER TO TYPICAL FOUNDATION DETAILS ON DRAWING S-7.
7. ALL WALL FOOTINGS SHALL BE INSTALLED CENTERED ON FOUNDATION WALL U.N.O.
8. TYPICAL MASONRY WALL REINFORCING = #5 @ 48"O.C., GROUT REINFORCED CORES AND ALL CMU BELOW GRADE SOLID. PROVIDE FOOTING DOWELS TO MATCH SIZE & SPACING OF WALL REINFORCING. INSULATE UNREINFORCED CMU CORES PER NOTES ON S-2.
9. REFER TO SITE/CIVIL DRAWINGS FOR EXTERIOR SITE GRADES. THIS FOUNDATION PLAN PREPARED ACCORDING TO GRADING PLAN PREPARED BY ELA DATED 03/30/2021 FOUNDATION DESIGN MAY CHANGE BASED ON FINAL SITE/CIVIL DRAWINGS.

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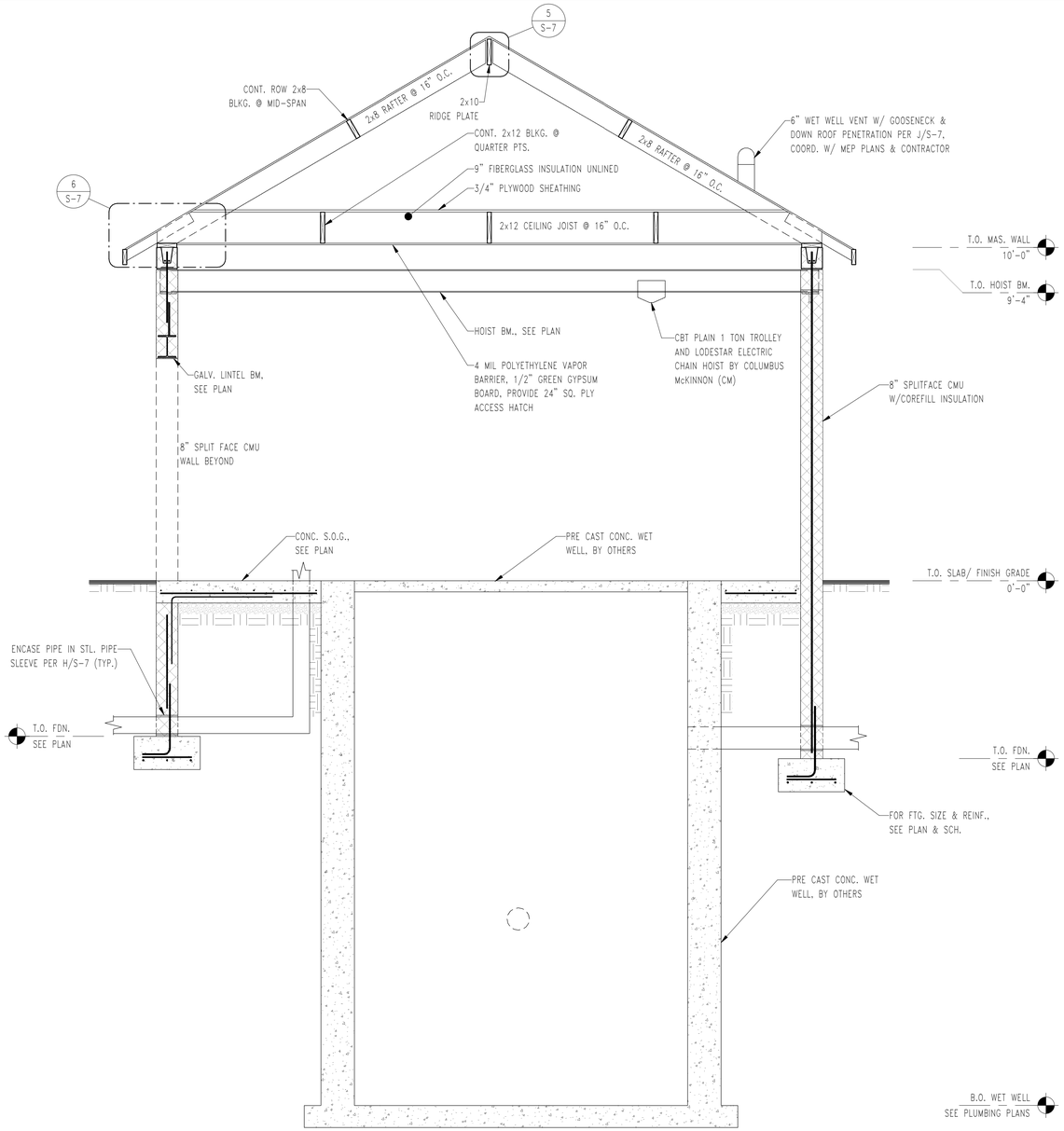
FOUNDATION PLAN
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

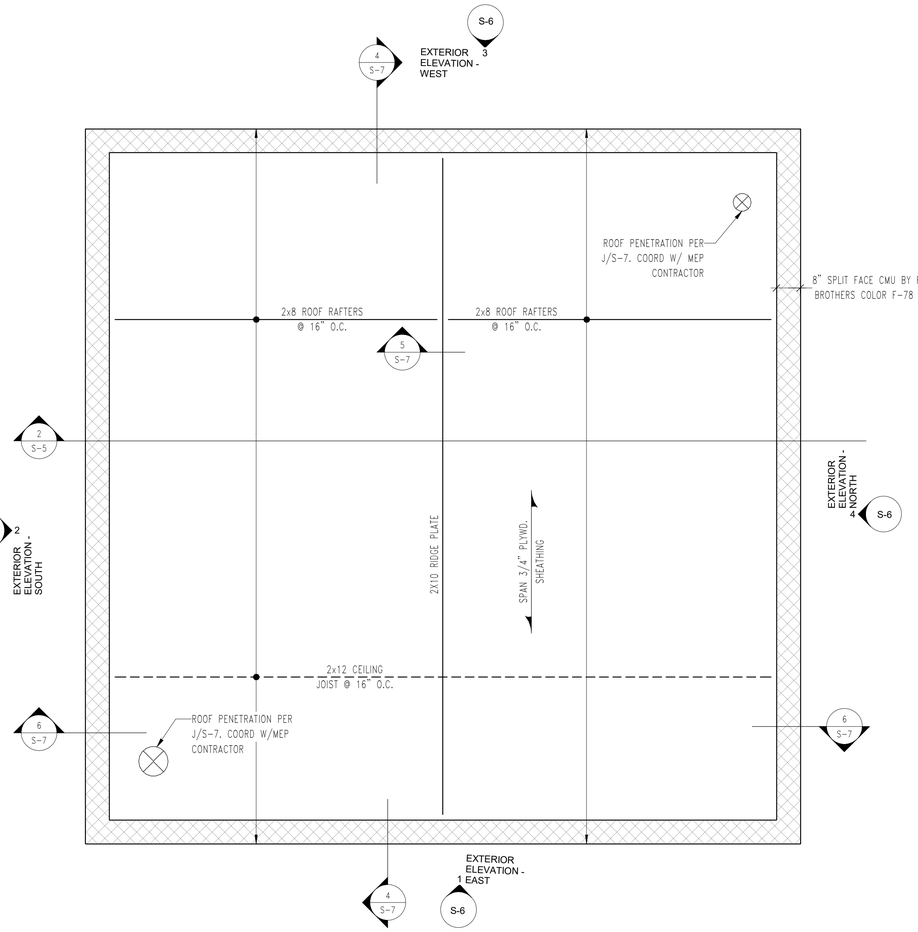
MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

DRAWING NO.
S-4



NOTE: STRUCTURAL SECTION ON SHEET S-5 IS ROTATED 90 DEGREES FROM THE MECHANICAL, ELECTRICAL, AND PROCESS DRAWINGS FOR CLARITY OF THE STRUCTURAL BEAM AND HOIST. IF CONTRACTOR HAS ANY QUESTIONS OR CLARIFICATIONS RELATED TO THE SECTION VIEWS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUBMIT A REQUEST FOR INFORMATION TO THE ENGINEER.

2 S-5 BUILDING SECTION
SCALE: 1/2" = 1'-0"



≥ 1 S-5 ROOF FRAMING PLAN
SCALE: 1/2" = 1'-0"

FRAMING PLAN NOTES

1. TOP OF CMU WALL REFERENCE ELEVATION = 10'-0" U.N.O. WRT. REF. EL. 0'-0".
2. REFER TO DETAILS ON S-7 FOR FRAMING REQUIRED TO SUPPORT ROOF AND CEILING OPENINGS. LOCATION & SIZE TO BE COORDINATED W/MECH. CONTRACTOR.

PRELIMINARY - NOT FOR CONSTRUCTION - 04.21.21

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STRUCTURAL ENGINEERS · ACHIEVING A HIGHER LEVEL
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Chadds Ford, PA 19317-9689
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LITITZ, PA 17543
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95% DESIGN SET

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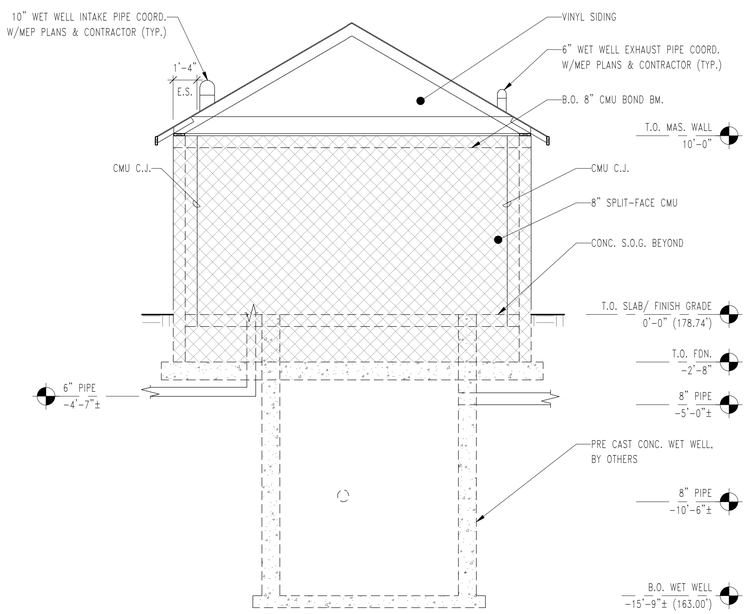
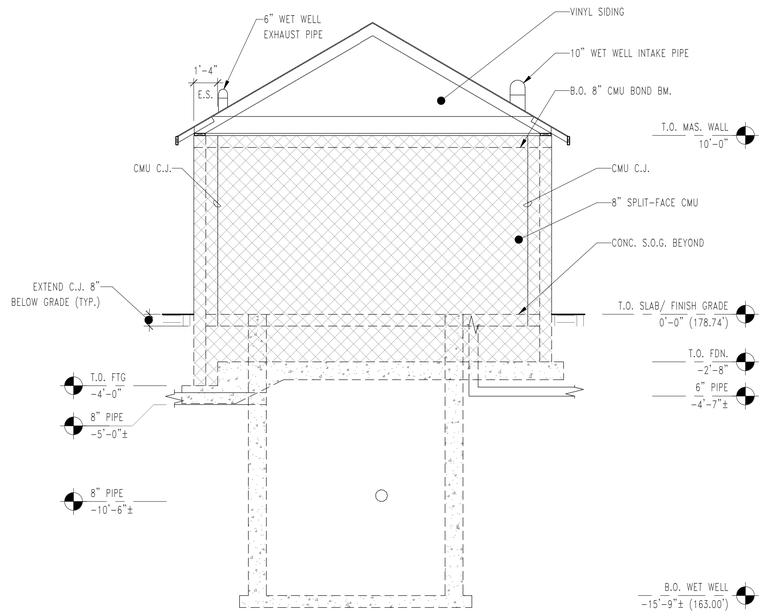
SUBJECT:
ROOF FRAMING PLAN & SECTION
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

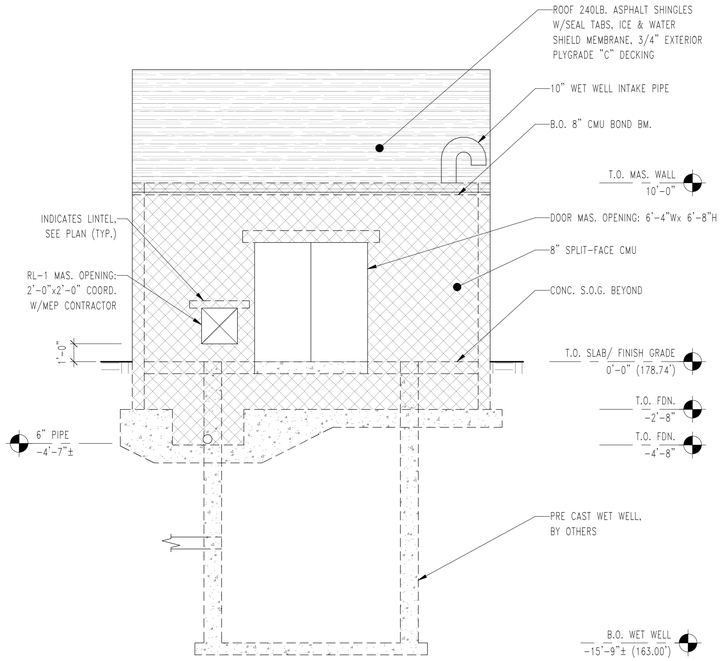
DRAWING NO.
S-5



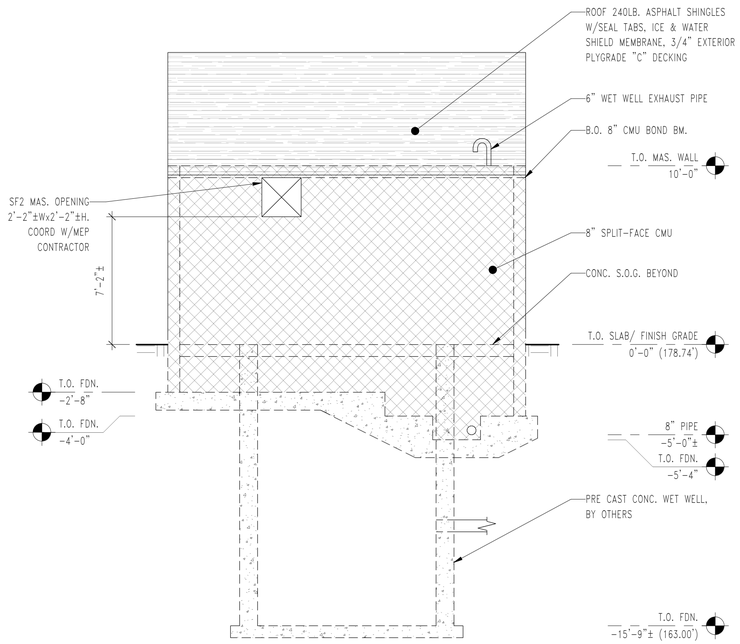
1 S-6 EXTERIOR ELEVATION - EAST
SCALE: 1/4" = 1'-0"



3 S-6 EXTERIOR ELEVATION - WEST
SCALE: 1/4" = 1'-0"



2 S-6 EXTERIOR ELEVATION - SOUTH
SCALE: 1/4" = 1'-0"



4 S-6 EXTERIOR ELEVATION - NORTH
SCALE: 1/4" = 1'-0"

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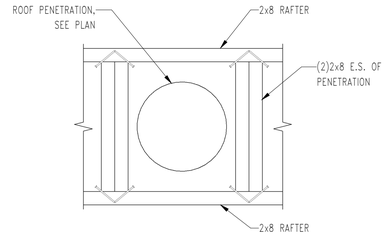
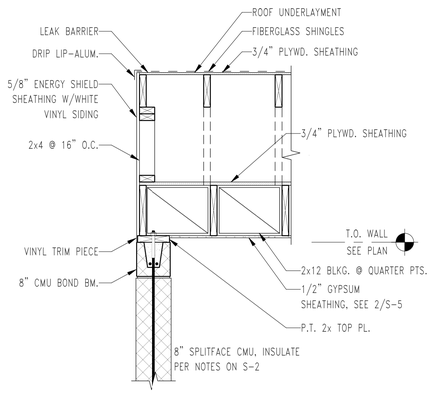
SUBJECT:
ELEVATIONS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
(302) 453-6900

MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

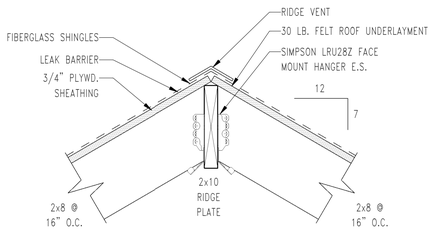
DRAWING NO.
S-6



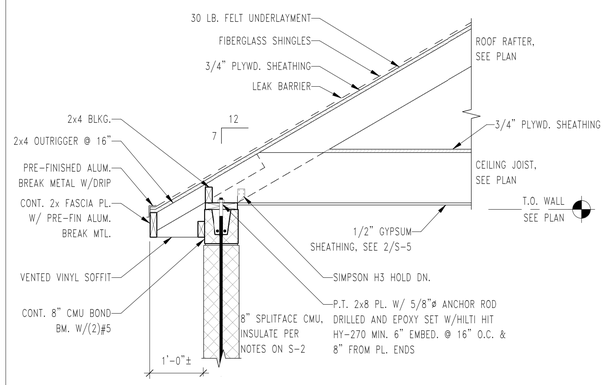
J / S-7 TYPICAL ROOF PENETRATION
SCALE: N.T.S.



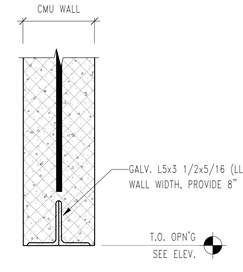
4 / S-7 GABLE END WALL SECTION
SCALE: 3/4" = 1'-0"



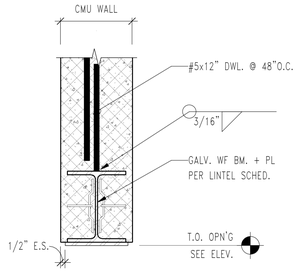
5 / S-7 RIDGE DETAIL
SCALE: 1 1/2" = 1'-0"



6 / S-7 BEARING WALL SECTION
SCALE: 3/4" = 1'-0"

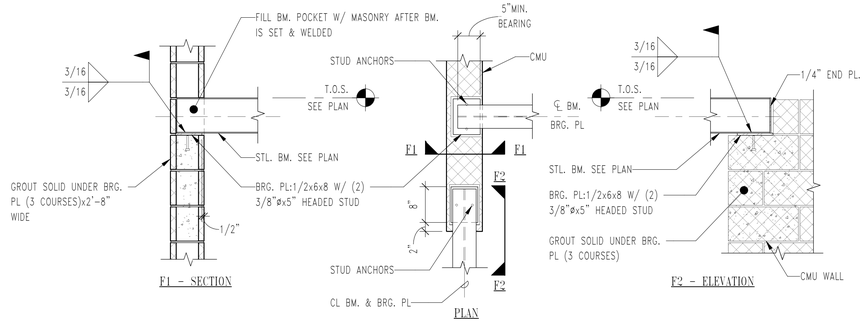


ANGLE LINTEL



WF LINTEL

E / S-7 TYPICAL CMU LINTEL DETAILS
SCALE: N.T.S.

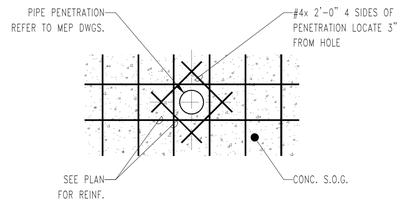


F1 - SECTION

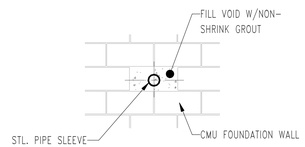
PLAN

F2 - ELEVATION

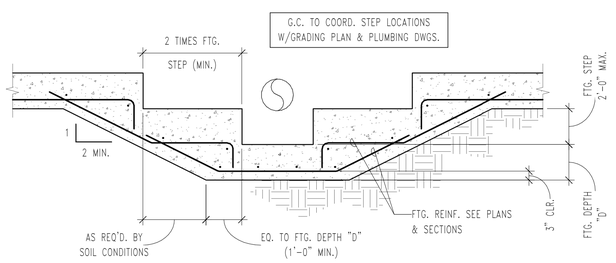
F / S-7 TYPICAL BEAM BEARING ON CMU WALL
SCALE: N.T.S.



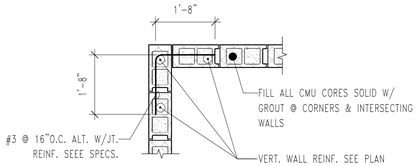
G / S-7 TYPICAL UTILITY THROUGH SLAB-ON-GRADE
SCALE: N.T.S.



H / S-7 TYPICAL UTILITY THROUGH CMU WALL
SCALE: N.T.S.

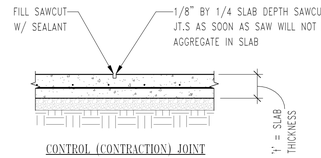


A / S-7 TYPICAL STEP FOOTING
SCALE: N.T.S.



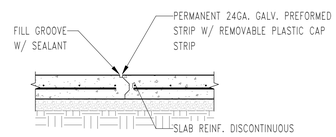
WALL SECTION @ CORNER

B / S-7 TYPICAL CMU WALL REINF.
SCALE: N.T.S.



CONTROL (CONTRACTION) JOINT

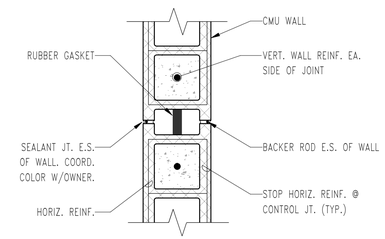
NOTE:
PROVIDE CONTROL JOINTS @ 36 TIMES 't' (12'-0"O.C. MAX.)



CONSTRUCTION JOINT

NOTE:
CONTRACTOR TO ADEQUATELY BRACE PREFORMED STRIP TO MAINTAIN STRAIGHT ALIGNMENT OF SCREED

C / S-7 TYPICAL S.O.G. CONTROL & CONST. JOINTS
SCALE: N.T.S.



NOTE: REFER TO GENERAL NOTES & ELEVATIONS FOR SPACING REQUIREMENTS

D / S-7 TYPICAL CMU WALL C.J.
SCALE: N.T.S.

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SUBJECT:
SECTIONS & TYPICAL DETAILS
FOR
AUBURN VALLEY PUMP STATION
NEW CASTLE COUNTY, DELAWARE
CLIENT:
ARTESIAN WASTEWATER MANAGEMENT INC.
664 CHURCHMANS ROAD
NEWARK, DE 19702
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MANAGER:	MHS	DATE:	04.21.21
DESIGNER:	RK	PROJECT NO:	ELA2001
DRAWN BY:	RK	SCALE:	AS SHOWN

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S-7